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March 28, 2012

Earl Liverman, On-Scene Coordinator
United States Environmental Protection Agency, Region 10
1910 Northwest Boulevard, Suite 208
Coeur d'Alene, Idaho 83814

RE: Contract No. EP-S7-06-02; Technical Direction Document No. 12-01-0001
Draft Work Plan and Conceptual Design, Avery Landing Site Removal Action
Avery, Idaho

Dear Mr. Liverman:

Enclosed please find the draft work plan and conceptual design for the removal action to be performed at the Avery Landing Site in Avery, Idaho. If you have any questions, please call me at (206) 920-1739.

Sincerely,

ECOLOGY AND ENVIRONMENT, INC.

Steven G. Hall

Steven G. Hall
START-3 Project Leader

enclosure

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DRAFT WORK PLAN AND CONCEPTUAL DESIGN

Avery Landing Site Removal Action
Shoshone County, Idaho
TDD: 12-01-0001

REGION 10
START-3
SUPERFUND TECHNICAL ASSESSMENT & RESPONSE TEAM

March 2012

Prepared for:

U.S. Environmental Protection Agency, Region 10
1910 Northwest Boulevard, Suite 208
Cœur d'Alene, Idaho 83814

Prepared by:

ECOLOGY AND ENVIRONMENT, INC.
720 Third Avenue, Suite 1700
Seattle, Washington 98104

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List of Abbreviations and Acronyms

µg/L	micrograms per liter
AST	above-ground storage tank
bgs	below ground surface
Bentciks	Larry and Ethel Bentcik
BMP	Best Management Practice
CERCLA	Comprehensive Environmental Response, Compensation, and Liability Act
CFR	Code of Federal Regulations
CWA	Clean Water Act
CY	cubic yard
E & E	Ecology and Environment, Inc.
EE/CA	Engineering Evaluation/Cost Analysis
EPA	U.S. Environmental Protection Agency
ERRS	Emergency and Rapid Response Services
FHWA	Federal Highway Administration
GAC	granular activated carbon
gpm	gallons per minute
IDEQ	Idaho Department of Environmental Quality
IDL	Idaho Department of Lands
IDW	investigation-derived waste
ITD	Idaho Transportation Department
LNAPL	Light Non-Aqueous Phase Liquid
OSC	On-Scene Coordinator
OWS	oil/water separator
PAH	polycyclic aromatic hydrocarbon
PCB	polychlorinated biphenyl
Potlatch	Potlatch Land and Lumber, LLC
PVC	Polyvinyl Chloride
RAO	Removal Action Objective
Site	Avery Landing Site
START	Superfund Technical Assessment and Response Team
SVOC	semi-volatile organic compound
TCP	traffic control plan
TDD	Technical Direction Document
TMA	Transportation Management Area
TMP	Traffic Management Plan
USDA	U.S. Department of Agriculture
VOC	volatile organic compound
WZSM	Work Zone Safety and Mobility

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1 Introduction

Ecology and Environment, Inc. (E & E) has been tasked by the U.S. Environmental Protection Agency (EPA) under Superfund Technical Assessment and Response Team (START)-3 contract number EP-S7-06-02, Technical Direction Document (TDD) 12-01-0001, to provide support for a removal action at the Avery Landing Site (Site). The Site is a former railroad roundhouse and maintenance facility for the Chicago, Milwaukee, St. Paul, and Pacific Railroad, located adjacent to the St. Joe River, one mile west of the town of Avery, in Shoshone County, Idaho, as shown on Figures 1-1 and 1-2. There are four property ownership interests associated with the Site, including those of the United States, Larry and Ethel Bentcik (Bentciks), Potlatch Land and Lumber, LLC (Potlatch), and the Idaho Department of Lands (IDL). The property of the United States at the Site is administered by the Federal Highway Administration (FHWA).

Soil, groundwater, surface water, and sediment at the Avery Landing Site contain petroleum hydrocarbons and Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA) hazardous substances that appear to be associated with the Site's historical use as a railroad roundhouse and maintenance facility. Petroleum hydrocarbons (diesel and heavy oil) and other hazardous substances are present in subsurface soil and groundwater and are discharging into the St. Joe River. Investigations and cleanup actions have been performed by Potlatch at the Site since the late 1980s pursuant to agreements with the Idaho Department of Environmental Quality (IDEQ). Assessments and investigations were also performed at the Site by the EPA in 1992 and 2007, and by IDEQ in the late 1980s.

The removal action for the Avery Landing Site will be performed to mitigate the release of hazardous substances into the St. Joe River, and to protect human health and ecological receptors by reducing concentrations of hazardous substances to acceptable human health and ecological receptor risk-based concentrations. The planned removal action was selected from a draft Engineering Evaluation / Cost Analysis (EE/CA) prepared by START and submitted to the EPA in December 2010, and is described in the Action Memorandum for the Avery Landing Site dated July 5, 2011.

This work plan provides a preliminary approach and conceptual design for guidance during implementation of the removal action on behalf of EPA. The planned removal action will involve the removal of contaminated soil for off-Site disposal, oil recovery during excavation for off-Site treatment or recycling, removal of failed oil treatment/recovery systems, and backfill and regrading of the excavated area. This design is considered conceptual and identifies parameters to be used during construction; it will be considered final following construction under the direction of a Federal On-Scene Coordinator (OSC). All subcontractors will be contracted by the Emergency and Rapid Response Services (ERRS) contractor. General construction site guidelines will be implemented to protect the community and workers throughout the duration of the removal action activities. Best Management Practices (BMPs) will be implemented to control for potential short-term cleanup-related impacts to workers, the community, and the environment.

1.1 Site Description and Background

Until the 1970s, the Avery Landing Site was used as a railroad switching and maintenance facility for several railway lines. Activities during this time included refueling locomotives, using solvents to clean engine parts, cleaning locomotives, and maintaining equipment. Most of the railroad facilities and structures were demolished after the operations ceased at the Site; however, contamination resulting from Site activities remain on Site in subsurface soils, groundwater, and light non-aqueous phase liquid (LNAPL) based on field investigations conducted in 2007 and 2009 (E & E 2007; Golder 2009).

Presently, there is little remaining at the Site to indicate its previous use as a railroad switchyard and maintenance facility, with the exception of a concrete slab and the remnants of rail lines. The Site consists mainly of graded gravel yards and small amounts of vegetative growth over previously backfilled areas. The eastern portion of the Site currently contains a vacation cottage and mule corral on the Bentcik property which are utilized on a seasonal basis. Figure 1-3 shows the existing Site features.

Numerous groundwater monitoring wells and "stick-up pipes" (polyvinyl chloride [PVC] pipes installed vertically in subsurface soil) are also located on the Site, which were used to monitor for the presence of LNAPL in groundwater during previous investigations. Additional larger wells on Site include those used for a product recovery system, which was installed for Potlatch in 1994. Other product recovery system features that still exist at the Site include a 5,000-gallon above-ground storage tank (AST) and a shed installed on a concrete slab, which were both used by Potlatch to store recovered product from 1994–2000. Currently, the shed is used to store absorbent booms used by Potlatch to control product discharges to the St. Joe River. Near the shed, drums of investigation-derived waste (IDW) from EPA's 2007 removal assessment are staged. These investigations and recovery actions are discussed briefly below and in detail in the draft EE/CA.

1.2 Previous Site Investigations and Cleanup Activities

Several investigations and cleanup activities have been performed since the 1970s to help identify the source of contamination and reduce petroleum discharges from the Avery Landing Site that were observed to occur along the St. Joe River. Previous Site evaluations and actions are described in detail in the draft EE/CA (E & E 2010). Historical investigations performed at the Site included the collection of samples from soil, groundwater, sediment, and surface water to evaluate the presence of contaminants, including volatile organic compounds (VOCs), semi-volatile organic compounds (SVOCs), metals, and polychlorinated biphenyls (PCBs) that exceed health-based screening criteria. Various cleanup actions have been initiated at the Site to prevent free product from reaching the river, including the installation of a product recovery system by Potlatch, placement of a containment barrier along the banks of the St. Joe River, and placement of booms within the river.

The continued presence of petroleum seeps and sheen in surface water at the Site indicate that the cleanup actions previously initiated have not been successful at preventing contamination from reaching the St. Joe River. Petroleum hydrocarbons have been observed in surface water, groundwater, and subsurface soil throughout the Site at levels that exceeded applicable state regulatory standards. Subsurface soil and groundwater samples collected from the Site also contained several CERCLA hazardous substances (including carcinogenic polycyclic aromatic hydrocarbons [PAHs]) that exceeded applicable state and federal guidelines. Additionally, several metals (arsenic, iron, lead, manganese, and mercury) also exceeded applicable guidelines; however, some of these metals may be naturally elevated in the region.

As described in the 2010 EE/CA, the scope of the proposed removal action would consist of the reduction of petroleum product and hazardous substances to acceptable human health and ecological risk-based concentrations at the Site. The removal action objectives (RAOs) developed for the Site include removing the current, non-functioning groundwater containment and extraction system installed by Potlatch; removing the bank and associated petroleum contamination; reconstruction of the bank; removal, treatment, and/or management of LNAPL and associated hazardous substances in the subsurface of the Site; and proper off-Site disposal of any waste streams generated during the removal action. To achieve the RAOs, the EE/CA identified removal action alternatives, including excavation of the contaminated soil, followed by either low-temperature thermal desorption, soil washing, or off-Site disposal of the contaminated materials. The recommended alternative for the removal action was excavation followed by off-Site disposal of LNAPL and contaminated soil. This alternative was found to be effective and implementable; it is the most straightforward and least likely problematic, and although it is not the least expensive to implement, the additional costs would be offset in part by avoiding potential cost increases due to administrative and technical feasibility concerns associated with the other alternatives.

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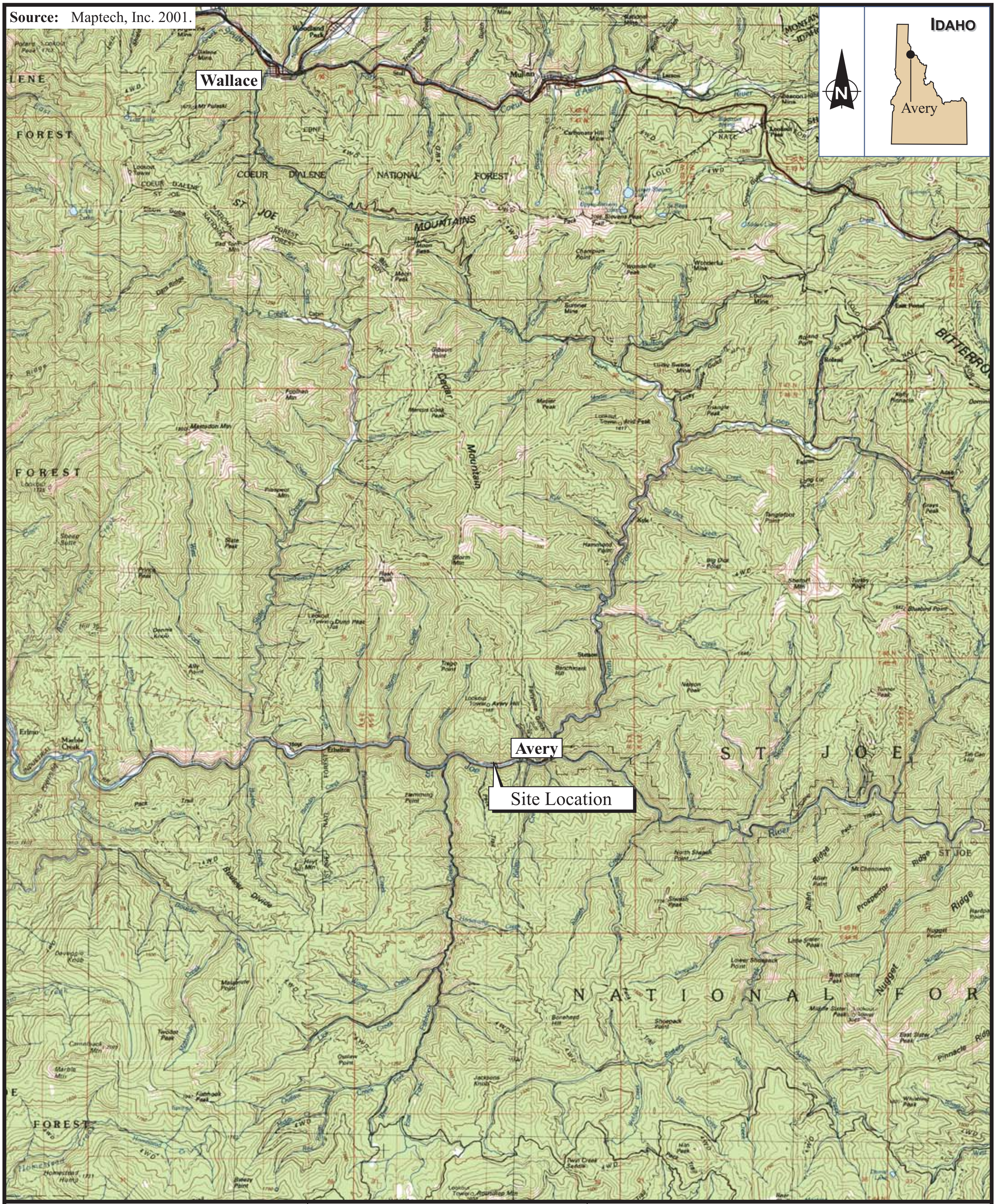

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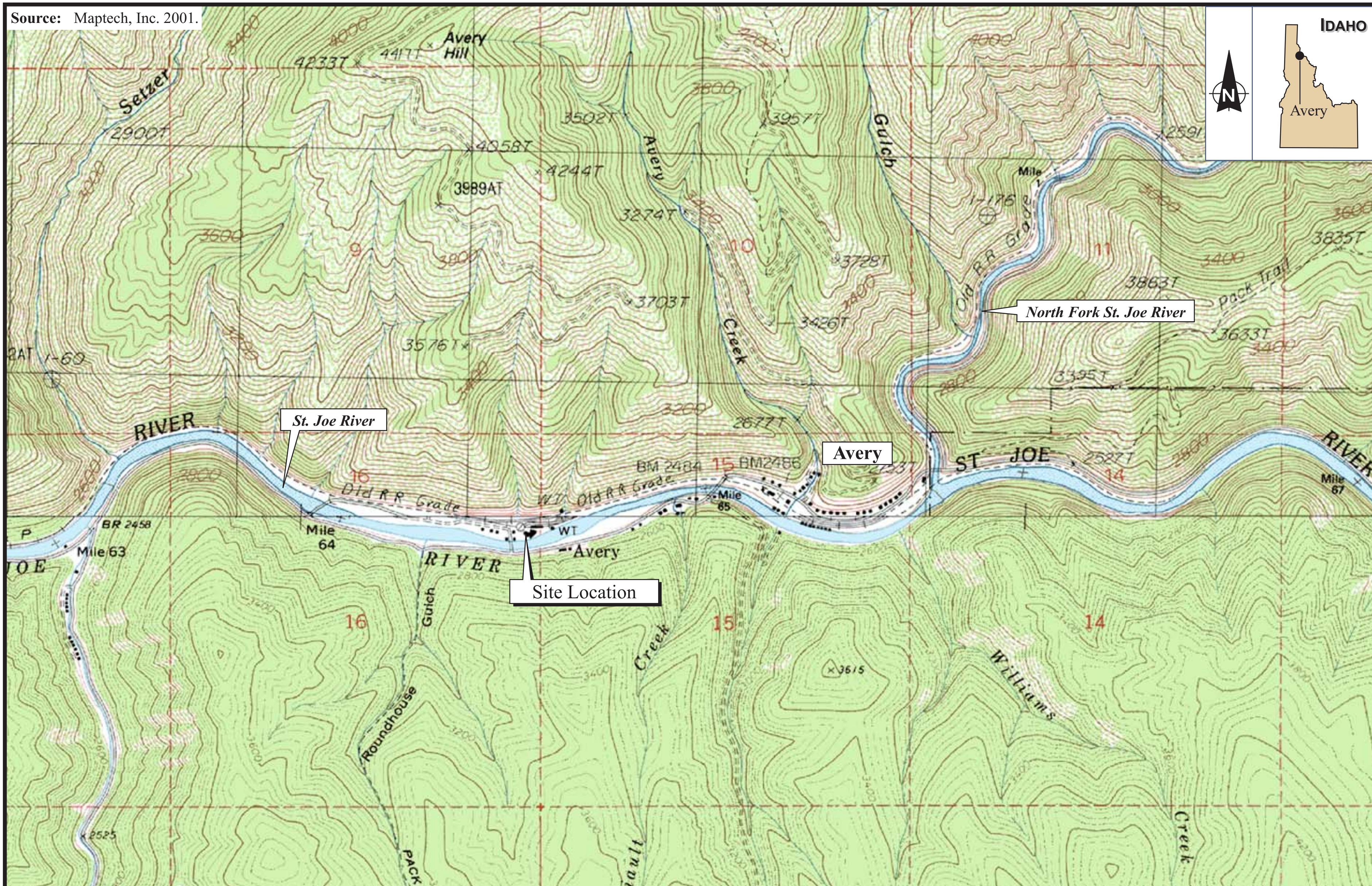
Seattle, Washington

AVERY LANDING SITE
Avery, Idaho

0 1.5 3
Approximate Scale in Miles

Figure 1-1
SITE LOCATION MAP

Date:	Drawn by:	
2-22-12	AES	10:START-3\08050006\fig 1-1



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Seattle, Washington

AVERY LANDING SITE
Avery, Idaho

0 1000 2000
Approximate Scale in Feet

Figure 1-2
SITE VICINITY MAP

Date: 3/15/12

Drawn by: AES

10:START-3\08050006\fig 1-2

Source: Golder 2010a.

Note: Aboveground structures have been removed except for the Bentcik seasonal residence and the AST and nearby shed.

LEGEND

Property Line & Section 16-15 Division Line

Site Boundary

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0 140
APPROXIMATE SCALE IN FEET

N

AVERY LANDING SITE
Avery, Idaho

Figure 1-3
SITE LAYOUT MAP

Date:	Drawn by:	
3/26/12	AES	10:START-3\08050006\fig 1-3

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2 Preliminary Approach and Conceptual Design

EPA is currently planning to conduct part of the removal action, and to have Potlatch perform the other part of the removal action under EPA oversight. The cleanup work to be undertaken by EPA will focus on properties of the United States and Bentciks, and also to some extent possibly a portion of the property of IDL. Potlatch will develop a separate work plan for properties it is responsible for cleaning up.

The preliminary approach and conceptual design for the planned removal action was developed to meet the RAOs. In general, the design for the removal action includes:

- Protect human health and ecological receptors by reducing concentrations of Site contaminants to acceptable human health and ecological receptor risk-based concentrations; and
- Mitigate the release of Site contaminants to the St. Joe River.

The following sections describe the approach for the removal action scheduled for the Site. The removal action selected involves the excavation of subsurface soil that is observed to be contaminated with petroleum contamination (diesel and heavy oils). Removal of this material is expected to eliminate the source and prevent the continued discharge of petroleum hydrocarbons and hazardous substances into the St. Joe River because the oil and contaminants are comingled and cannot be separated.

Approximately 57,000 cubic yards (CY) of contaminated soil is anticipated to be excavated from the four portions of the Site and disposed of off-Site. Additionally, it is estimated that approximately 90,770 CY of clean overburden will also require excavation and will be stockpiled on Site for re-use as backfill material. Based on previous Site investigations, the excavation is anticipated to extend as deep as 20 feet below ground surface (bgs). Removal extents will be determined based on field observations (i.e., presence of free-phase petroleum hydrocarbons, oil-stained soil, visible oil sheen, petroleum odor, petroleum sheen testing, and/or field organic vapor monitoring). The effectiveness of the individual screening methods will be evaluated at the onset of the project and will undergo further evaluations throughout the removal process. Prior to backfilling excavated areas, soil samples will be collected to establish a baseline to monitor natural attenuation for any residual contamination in the Site media. Excavated areas will be backfilled using the stockpiled clean overburden and additional imported clean backfill, as necessary. The Site will be graded for natural drainage and covered with approximately 6 inches of topsoil and revegetated. Dewatering and oil recovery are anticipated to be required during excavation based on LNAPL observations made in groundwater monitoring during past investigations. Recovered oil will be transported to an off-Site treatment and/or recycling facility. Treated groundwater will be discharged into the St. Joe River and/or used for dust suppression.

The 1994 oil recovery system, the 2000 oil containment barrier, and debris such as foundations from historical Site operations, will also be removed and either reused as backfill material where practicable, or disposed of at an appropriate off-Site facility. Removal of the 2000 oil containment barrier and any other work on the bank will be limited to only those areas where the 2000 shoreline impermeable barrier is suspected to be breached. If such shoreline work is necessary, it will be performed only after mid-July and in such a manner as to avoid and minimize adverse effects on the aquatic environment. Additionally, the shoreline will be reconstructed to resemble its current configuration.

Currently, the removal action is scheduled to be performed from the spring until late fall of 2012. The details presented below and in Figure 2-1, which shows the Removal Area Layout, will be used as a basis for conducting the removal action. It is probable that upon implementation of excavation and other removal activities, actual Site conditions will result in field modifications to the presented approach.

2.1 EPA and Potlatch Cleanup Coordination

EPA is currently planning to perform part of the removal action, and to have Potlatch perform the other part of the removal action under EPA oversight. Because the cleanup work to be undertaken by EPA is located upgradient of the cleanup work to be undertaken by Potlatch, EPA will perform its cleanup first, with Potlatch beginning its cleanup after the EPA cleanup is completed. EPA will coordinate with Potlatch and its contractors to ensure an orderly Site cleanup transition and to prevent cross-contamination at the property boundaries.

2.2 Site Control and Site Access

During implementation, temporary site controls will be utilized in order to provide means for the protection of public health, safety, welfare, and the environment, and to maintain the effectiveness and integrity of the removal action. In general, these site controls will consist of fencing and other means to restrict public access to the Site that will be installed and maintained along the perimeter of the Site, including along the banks of the St. Joe River and Highway 50 that runs parallel to the Site boundaries. Signage will also be posted around the perimeter of the Site including the shore line to prohibit unauthorized entry of persons to the work areas. All activities associated with the excavation and the disposal of excavated material will be restricted to the designated working limits on Site. Staging and storage of clean construction materials or equipment (e.g., parking of personal vehicles, clean backfill/equipment, project trailer, etc.) will also be maintained on Site.

Site access will be achieved by utilizing Federal Highway Route 50 and temporary Site access roads. Traffic detouring and disruption that may result from the removal action is discussed in Section 2.5. Access roads within and outside the working limits at the Site will be maintained to allow for uninterrupted equipment/personnel access. To provide equipment access to the excavation areas from the storage/staging and laydown zones, additional temporary access roads and gravel equipment pads may be constructed for the staging of clean equipment and/or materials. Access roads will be constructed by first performing limited grading, then placing geotextile, as necessary, and gravel on graded surfaces. Actual locations of any additional temporary access roads will be determined in the field immediately prior to commencement of work, and location selection will be based on equipment limitations and access requirements.

2.3 Site Preparation

2.3.1 Utility Locate and Services

Prior to initiating work at the Site, coordination with local utility companies will occur to obtain service for the temporary on-Site facilities that will be utilized during implementation of the removal action (i.e., water-treatment facility, temporary construction trailers, etc.). In addition, utility locating agencies will be contacted in order to identify, protect, relocate, or abandon any aboveground and/or subgrade utilities that exist at the Site that might interfere with the removal activities. Active utilities located within/adjacent to the excavation areas such as the existing community sewer line will require demarcation and precautionary measures or temporary relocation for their protection. In the instance where utilities need to be relocated, interruptions of service observed by adjacent property owners and residents will be minimized to the extent possible.

2.3.2 Clearing and Grubbing

Throughout the removal action, activities will be restricted in an effort to preserve existing vegetation. A limited amount of clearing and grubbing will be performed to clear trees and vegetation only in specific areas that are required for the removal activities.

Clearing will consist of the felling, trimming, and cutting of trees into sections, and the reuse of the trees and other vegetation designated for removal, including downed timber, snags, and brush occurring within the support area, excavation areas, and the repository. Cleared vegetation will be cut off flush with or below the original ground surface. Cleared trees and brush will be used as erosion control slash to the extent practicable.

Grubbing will consist of the removal and reuse as erosion control slash material of stumps, roots larger than 3 inches in diameter, and matted roots from the same areas that require clearing.

2.3.3 Decommissioning of Existing Treatment System and Monitoring Wells

Monitoring wells and piezometers located within the removal area will be decommissioned in accordance with applicable rules and regulations prior to removal activities. Appropriate measures will be taken to protect monitoring wells that are located outside of the removal area during construction activities.

Once removal activities are complete, new monitoring wells will be installed at the Site. The specific number and locations of monitoring wells to be installed will be determined at the conclusion of the construction phase of the removal action, and these monitoring wells (along with any existing monitoring wells not impacted by Site activities) will be used as a part of the post-removal Site monitoring plan.

2.3.4 Drum Removal

The 55-gallon drums containing IDW from past EPA assessment activities will be removed from the Site by EPA and will be disposed of at an appropriate off-Site facility.

2.3.5 Cultural Resources

In response to consultation with the Idaho State Historic Preservation Office, EPA will perform a pedestrian survey at the Site to identify and record any cultural resources that may be visible at the ground surface and/or observed in exposed soil profiles. The pedestrian survey will be performed at the beginning of Site removal activities.

2.4 Construction Site Layout

As part of Site preparation, access roads, clean equipment/material staging areas, decommissioning areas, and temporary facilities will be required to conduct removal activities. Access roads and staging pads will be installed by performing limited grading (as necessary), then placing geotextile (as necessary) and gravel on the graded surface. The actual locations of the temporary access roads, staging areas, equipment pads, temporary construction facilities (travel trailer, water treatment system, temporary utilities, etc.), and vehicle loading zones will be finalized in the field prior to commencement of the removal action; however, Figure 2-2 shows the preliminary construction site layout zones that have been proposed for the Site. To the extent feasible and practicable, temporary staging and vehicle loading areas will not be established in locations that may interfere with construction operations or necessary traffic flow. In order to construct the temporary road and provide sufficient protection for the cabin located on the Bentcik property, the cabin will be temporally relocated. Upon completion of the removal activities, the cabin will be placed back in its original location.

2.5 Road Detour and Traffic Control

Contaminated soil is present under a portion Highway 50, and as such, closing of the highway will be necessary, and traffic will be rerouted through the Site while removal work is performed on the highway (see Section 2.5). FHWA will provide the final design for replacing the portion of Highway 50 that will be removed as part the of the excavation activities.

2.5.1 Detour Road Installation During Excavation Under Highway 50

The activities to be performed at the Site will be phased in such a way that will require the construction of a temporary detour for Highway 50 while the contamination under the highway is being removed. The detour road will be a single-lane road and consist of a gravel base. Existing Site access roads will be utilized to the extent possible (see Figure 2-3 for proposed detour layout). As specified by the FHWA, signage and traffic control devices for the temporary detour road will be in accordance with the requirements of the Manual on Uniform Traffic Control Devices.

Once the excavation under Highway 50 has been completed, the highway will be restored to FHWA and Idaho Transportation Department (ITD) requirements, as applicable, and the detour road will continue to provide access to removal areas for Site personnel. To provide for a safe work zone and allow for passage of vehicles around the worksite per FHWA and state requirements, traffic controls will be implemented as described below.

Highway 50 is a low-traffic arterial thoroughfare; in order to accommodate larger vehicles (i.e., semi-trailers and logging trucks) that utilize this highway, the single lane detour will have a minimum width of 10 feet with 2-foot shoulders on either side. Details 1 and 2 on Figure 2-4 indicate the thicknesses of the subbase, base, and top gravel layer courses that will be required; roads should be constructed as specified in the FWHA Gravel Roads Maintenance and Design Manual (FHWA 2000). All aggregate material will meet the requirements of Section 703 of the ITD Standard Specifications for Highway Construction (ITD 2011). Tables 2-1, 2-2, and 2-3 below provide a summary of proposed gradation that is recommended for each gravel course to be applied at the Site.

Table 2-1 Proposed Gradation for Detour Road Aggregate Subbase (ITD Specification Section 703.11)

Aggregate Size	Percent Passing
4 inches	100
3 inches	90–100
No. 4	30–75
No. 2	0–13

Table 2-2 Proposed Gradation for Detour Road Aggregate Base Course (ITD Specification Section 703.04)

Aggregate Size	Percent Passing
1 inch	100
¾ inch	90–100
No. 4	40–65
No. 8	30–50
No. 30	10–25
No. 200	3–10

Table 2-3 Gradation for Detour Road Aggregate Gravel Surface Course (ITD Specification Section 703.04)

Aggregate Size	Percent Passing
¾ inch	100
No. 4	50–78
No. 8	37–67
No. 30	13–35
No. 200	4–15

A geotextile fabric will also be installed as necessary between the existing grade and the base layer to aid in proper drainage. The geotextile will be Type II and meet the requirements of Section 718.05 of the ITD Standard Specifications for Highway Construction (ITD 2011). Where existing access roads can be utilized to construct the detour road, it is assumed that the existing roadway will be sufficient to act as the subbase material; however, additional subbase material may be required along the shoulders if these access roads need to be widened. A grader will be kept on Site to maintain the detour road and the shoulders to the appropriate thicknesses and grades.

Along the eastern portion of the Site, two 12-inch, 16-gage corrugated steel culverts are proposed to be installed under the detour road in order to provide passage for runoff from an existing drainage ditch; these culverts can also be utilized to divert any dewatering water from the excavation areas into the treatment system. Culverts selected shall be able to handle vehicle loading anticipated at the Site and must meet the requirements of Section 600 of the ITD Roadway Design Manual. The ITD Roadway Design Manual indicates that the culverts need to be installed so that they are approximately 3 feet below the top of the road surface (ITD 2011). Appropriate erosion control measures will be used at the inlet and outlet ends of the pipes to maintain road slope stability.

2.5.2 Control and Regulation of Traffic

There are two aspects of traffic control at the Site: the routing of Highway 50 vehicular traffic (i.e., public traffic), and the routing of Site-related traffic.

Publicly owned and operated vehicles (i.e., those not related to Site activities) will be routed through a portion of the Site as a result of the temporary closure of Highway 50. The temporary highway detour and transportation operations (e.g., traffic management controls) will require design by a certified traffic control design specialist, and a Traffic Management Plan (TMP) will be created by a subcontractor selected by the ERRS contractor.

The movement of equipment and personnel during on-Site operations (e.g., construction equipment staging, waste and fill hauling, and Site personnel access) will be controlled by the on-Site traffic control plan (TCP) discussed herein.

2.5.2.1 Traffic Management Plan

The U.S. Department of Transportation definition of the project as either a "significant project" or a "non-significant project" defines the planning that needs to go into creating a TMP. The ITD Work Zone Safety and Mobility (WZSM) Program Manual defines a significant project as "one that, alone or in combination with other concurrent projects nearby, is anticipated to cause sustained work zone impacts that are greater than what is considered tolerable based on engineering judgment. All Interstate system projects within the boundaries of a designated Transportation Management Area (TMA) that occupy a location for more than three days with either intermittent or continuous lane closures shall be considered as significant projects." The Northern Ada County Metropolitan Planning Area is Idaho's only designated TMA; given that this project is not located in Ada County, it will be considered a non-significant project.

The ERRS subcontractor should verify that their subcontractors possess Traffic Control Design Specialist training. This training addresses the entire process for designing, installing, maintaining, and evaluating temporary traffic control in work zones and is recommended for individuals responsible for temporary traffic control design and for individuals that are responsible for designing TMPs for approval. Additional training may be necessary if nighttime traffic control, flagging operations, signs requiring supports, portable changeable message boards, arrow panels, channelizing devices, pavement markings, raised pavement markers and delineators, warning lights and floodlights, or other TO devices are anticipated for use.

2.5.2.2 On-Site Traffic Control Plan

The on-Site operations require coordination with the TMP. If TMP requirements differ from those contained within the on-Site TCP, TMP requirements shall prevail. The purpose of the on-Site TCP is to ensure that on-Site movement of equipment and material are performed in a safe manner. The details of the on-Site TCP are presented Appendix C.

2.6 Excavation

Using standard excavation equipment, excavation of the clean overburden and contaminated soils will be initiated in the upgradient portion of the LNAPL plume area and completed in the downgradient portion to reduce the potential recontamination of backfilled soils.

2.6.1 Field Screening

After the clean overburden is excavated, the depth of excavation will be based on visual evidence of LNAPL-contaminated soil. The extent of excavation will be determined based on field observations (i.e., presence of free-phase petroleum hydrocarbons, oil-stained soil, visible oil sheen, petroleum odor, petroleum sheen testing, and/or field organic vapor monitoring). The effectiveness of the individual screening methods will be evaluated at the onset of the project and will undergo further evaluations throughout the removal process. The procedure for conducting the petroleum sheen test will consist of collecting approximately 50 grams of representative soil at the selected locations within a glass container and applying water until the soil is saturated and water collects around it. Visual classification of the representative soils will be recorded according to the magnitude of oil sheen observed, as described below:

1) None (no sheen visually detected);
2) Sheen (oil film present, but does not display rainbow); and
3) Rainbow (definite oil sheen, film, or product that displays rainbow).

A passing test will be defined as soil that does not exhibit a rainbow sheen. If a rainbow sheen is observed in a sample, or if any of the other field screening methods (i.e., presence of free-phase petroleum hydrocarbons, oil-stained soil, visible oil sheen, petroleum odor, and/or field organic vapor monitoring) indicate the presence of petroleum, additional excavation will be required and re-screening will be performed until a passing test is achieved. Excavation will stop if the soil sample passes the field screening tests.

2.6.2 Excavation Extent and Sequence

Excavations will extend to the bottom of the LNAPL contaminated soil or to a maximum depth of approximately 2 feet below the seasonal low groundwater level (which is an average depth of 17 feet bgs). In order to track progress associated with the excavation activities, a grid layout as shown in Figure 2-5 has been developed. Additionally, Figure 2-6 provides a typical cross-section view of how the excavation, dewatering, and backfilling operations would be performed. Based on the stability of the excavation using field observations, side slopes will be laid back to a suitable angle of repose which for the purposes of this WP is assumed to be a 3:1 slope. Excavated soils will be placed in two temporary staging areas depending on whether the soil is deemed clean or contaminated, as described in Section 2.6.1. Clean soil will be used as backfill as described in Section 2.6.6, and contaminated soil will be stockpiled, characterized, and loaded onto haul trucks and transported to an appropriately licensed disposal facility as described in Section 2.7.

In the event that Site conditions prohibit further excavation of contaminated materials (i.e., bedrock is encountered in the side walls, depth of excavation is greater than two feet below the water table, etc.), removal activities will be halted. In such a situation and for side wall excavations, a geotextile fabric (i.e., a 40 millimeter HDPE liner or similar) shall be placed between the wall of the excavation and the clean backfill as a means of demarcation prior to backfilling. Since the liner is used to mark the location where excavation activities stop and it is not intended to act as a barrier, welding will not be required. Dependent upon the horizontal length of the side wall and the width of the liner material, it may be necessary to install multiple sheets. While welding of the liner is not required, it is necessary that a minimum 1-foot overlap of material is maintained. The liner is to be secured into the excavation side walls using manufacturer's recommended materials and installation procedures.

2.6.3 Excavation Dewatering

Groundwater and stormwater have the potential to impact excavation activities. To minimize dewatering, soil below the water table will be removed during periods of low water levels (summer and fall). Initially, an estimated 100 gallon-per-minute (gpm) pump with a floating suction line will be used for dewatering operations. This will also facilitate the removal of free product. After initial free product recovery is complete, estimated 20 gpm trash pumps will be used to depress and maintain the groundwater level near the base of the excavation. To prevent LNAPL migration into deeper portions of the saturated zone that were previously uncontaminated, monitoring of the groundwater level within the open excavation will be performed to maintain a level that is not below the smear zone. The use of absorbent booms to reduce LNAPL from coming into contact with clean faces of the excavation will also be used. The dewatering system will be installed to allow continuous operation without interfering with other construction activities. Water removed by the dewatering system will require treatment, as described in Section 2.6.5, prior to discharge into the St. Joe River or re-use for dust suppression measures. Site-wide stormwater runoff will be controlled and directed away from the excavation areas to minimize infiltration, as described by the BMPs located in Appendix A.

2.6.4 Excavated Soil Stockpiling and Dewatering

Depending upon the selection of disposal sites, as many as three soil staging pads may be constructed in the western portion of the Site to store excavated soil. One staging pad will be designated for clean overburden soils, and two staging pads will be designated for contaminated soils. Each staging pad will be built to stockpile approximately 5,000 CY of soil. During non-working hours (i.e., at night or on weekends), the stockpiles will be covered with plastic liner to protect the contaminated soil piles.

The staging pad for contaminated soils will be lined with a minimum of 40-millimeter thick, chemical resistant, impermeable liner with a 1 percent grade toward a collection sump. The base will be surrounded by a 2-foot-tall clay dike with 1:1 slopes. The staging pad will prevent soil contaminants from being carried off Site with contact water; wastewater collected from stockpiles will be pumped into the treatment system.

Stockpiling of the contaminated soils will allow time for sufficient dewatering of the soils to occur prior to transport to the disposal facility. Soils will be eligible for transport once visible evidence of liquid is no longer observed and a representative spoil sample passes the Paint Filter Test (EPA Method 9095). This is a relatively simple, inexpensive field test that includes suspending a conical paint filter (mesh number 60 +/- 5 percent) filled with a representative, approximate 100 gram sample from the soils pile from a tripod or ringstand for five minutes (EPA 2012). If any portion of the material passes through and drops from the filter, the material will be deemed to contain free liquids and will be returned to the spoils pile for additional handling and dewatering. Accumulated liquids from the dewatering process will be pumped into the water treatment system and treated, as described in Section 2.6.3, prior to discharge into the St. Joe River or re-use for dust suppression measures.

2.6.5 Water Treatment

Concurrent with the activities described in Sections 2.6.1 through 2.5.4, a water treatment system will be constructed. The system will be designed to collect, handle, containerize LNAPL, treat and discharge water generated during dewatering of excavated soil as well as rainfall runoff that accumulates in excavation or containment areas, water generated from equipment and personnel cleaning, and additional groundwater or surface water encountered or generated during removal activities.

As described above, removal excavations may be required to extend to a depth of approximately 2 feet below the seasonal low groundwater table (which has an average depth of 17 feet bgs) at various locations on the Site, depending on the identification of soil contamination. In order to minimize groundwater infiltration and the amount of dewatering required in the excavated areas, the majority of the removal activities are proposed to be performed during periods that would be most representative of low groundwater levels (summer/fall). Soil handling will continue in the staging areas until the spoil piles can pass the Paint Filter Liquids Test (EPA Method 9095). Liquids generated during gravity dewatering will be collected and pumped via a temporary pipeline to the treatment facility.

The temporary water treatment system design is based on anticipated influent characteristics as determined by a review of groundwater samples collected from on-Site monitoring wells during sampling events in 2007 and 2009. Based on the analytical results of the groundwater samples, the following maximum influent design parameters for the temporary water treatment system have been identified in Table 2-4.

Table 2-4 Influent Design Parameters

Design Parameter	Estimated Maximum Concentration in Groundwater (µg/L)
Benzo[a]anthracene	1.6
Benzo[a]pyrene	0.85
Benzo[b]fluorthene	0.84
Bis(2-ethyl hexyl)phthalate	390
Chrysene	3.0

Table 2-4 Influent Design Parameters

Design Parameter	Estimated Maximum
n-Nitrosodiphenylamine	12
Arsenic	88.6
Cadmium	1.07
Chromium	35.6
Copper	132
Lead	39.8
Thallium	1.4
Zinc	32000
Total PCBs	0.028

Key:
µg/L = micrograms per liter
PCB = polychlorinated biphenyl

2.6.5.1 Design Overview of Temporary Water Treatment System

The temporary water treatment system will need to treat a minimum flow of 70 gpm based on an estimate of the groundwater flow rates that are anticipated to occur at the Site (calculations provided in Appendix D). Depending upon the size of the open excavation that is at or below the water table, the amount of groundwater entering the excavation may increase. Therefore, it is proposed that the treatment system have a capacity of 250 gpm to allow for flexibility associated with excavating and backfilling procedures. Normal influent flow rates are expected to be less than the design maximum flow conditions and are likely to be highly variable (i.e., dependent on Site conditions such as precipitation events, the area where excavation activities are being conducted, the rate of surface water and groundwater infiltration, duration of dewatering activities, etc.). The temporary water treatment system will likely consist of the following components:

Influent Storage Tank: Waste water generated during the removal action will be pumped into the influent storage tank(s). The treatment system will have a minimum influent storage capacity of 100,000 gallons, which will have approximately 24 hours of storage per tank at the maximum expected flow rate. Following storage, the water will be pumped to an Oil/Water Separator (OWS).

Oil/Water Separator: The OWS will be rated for a maximum flow rate of 250 gpm. The OWS will be a gravity-type rectangular channel coalescing OWS capable of removing gross free oil and similar floatable products and will include collection chambers for settable sludge/solids recovery. The OWS will also have an adjustable oil skimming assembly that will skim floating oil into an oil collection chamber where it will gravity discharge to a 55-gallon oil storage drum. Process water that leaves the OWS will gravity-flow into a liquid-phase granular activated carbon (GAC) system.

GAC System: The design of the GAC system shall include a total of four skid-mounted GAC vessels that will each have a hydraulic capacity of 40 gpm. The system will be installed so that there are two treatment trains (primary and secondary) with only two units operating in series at any given time. Each vessel shall have the capacity to hold approximately 5,000 pounds of carbon. The GAC system shall be a gravity-flow application where water will be routed through the GAC vessels in series during normal treatment system operations. When the primary GAC vessel becomes spent (breakthrough of constituents above permitted limits are observed), a carbon change-out will occur, and at this time the secondary vessel will be moved to the primary position in order to ensure continuous treatment.

Effluent Holding Tanks: Following treatment process, water will flow into a series of 10,000 gallon effluent storage tank prior to sampling, testing, and discharge.

In addition to the main components of treatment, temporary piping, meters, transmitters, switches, and gauges will also be required. All the equipment included for the temporary treatment system will be trailer-mounted to allow for easy removal once the removal activities have been completed.

Removal activities are anticipated to only occur during one typical non-winter construction season, and the system will not need to be enclosed in a structure to protect against freezing. The temporary water treatment system will be constructed in a containment area surrounded by a berm to provide secondary containment equal to the minimum of 110 percent of one storage tank, and a one-year 24-hour storm event of approximately 1.5 inches (USDA 1963).

2.6.6 Backfill

The excavation areas will be backfilled to the original surface grade with the stockpiled clean overburden and additional suitable fill material originating from an approved off-Site borrow source. The backfill sequence will be determined in the field and will depend on site conditions, available working space at the surface, and the size of the open excavation. Prior to backfilling any specific grid, soil samples will be collected from the floor and sidewalls of the excavated area, as necessary, to achieve the sampling goals discussed in Section 2.8.

Backfill material will be inspected prior to placement, and all roots, vegetation, organic matter, or other foreign debris will be removed. Stones larger than 6 inches in any dimension will be removed or broken. Stones will not be allowed to form clusters with voids. When backfill material is too dry for adequate compaction, water shall be added to the extent necessary. Treated effluent from the water treatment system may be used for this purpose.

2.6.6.1 Backfill of Removal Area

The fill material used to establish rough grade for the removal area, not including the removal area associated with Highway 50, will be placed in 24-inch lifts and compacted with equipment suitable for the soil type. At least one field density test for every three lifts will be taken in accordance with ASTM D1556. Additional field density tests using ASTM D2942 (nuclear density gauge) may also be used.

Excavation will be compacted to 90 percent of maximum relative density. Figure 2-6 illustrates the coordination between excavation activities, dewatering, and backfilling.

The topsoil used to establish final grade will be placed in a single loose lift of not less than 4 inches. No compaction is required for the final grade.

2.6.6.2 Reconstruction of Roadway

Backfill operations associated with the portion of the removal area within the Highway 50 right-of-way will meet FHWA construction specifications.

2.6.7 Removal Activities along St. Joe River Shoreline

As part of the removal activities at Avery Landing, portions of the shoreline may need to be excavated and reconstructed in order to address LNAPL contamination that may be observed during excavation of the upland areas of the Site that extend toward the river bank. The exact length of affected shoreline will not be known until the upland excavation work progresses; however, based on observed historic chronic free product and seep discharges to the St. Joe River, it is anticipated that disturbance of the shoreline will most likely be limited to a length of 200 to 300 feet. Shoreline reconstruction activities will occur during the seasonal low river elevation period (i.e., between July 15 to September 1, 2012) in order to minimize negative impacts on the aquatic environment. The shoreline will be reconstructed to resemble its current configuration and the removal activities will be limited to the following: excavation and off-Site disposal of observed contaminated soil and shoreline features, and removal and decontamination/washing and/or replacement of disturbed rip-rap. Disposition of the removed materials will be as follows:

<u>Clean Riprap</u>: Based on field observations, the upper 12 vertical feet of the existing riprap is free of contamination, unless observed to be otherwise. This clean riprap will be hauled to a specified on-Site area and stockpiled for later reuse.

<u>Contaminated Riprap</u>: It is anticipated that the lower 3 vertical feet of the existing riprap may be contaminated within a 200 to 300 foot section along the shoreline. This material will be hauled and stockpiled on a geomembrane-lined staging treatment area and will be steam-cleaned and/or pressure-washed to remove the contamination. This riprap will then be stockpiled with the clean riprap for later reuse.

<u>Foundations</u>: Based on historical records, it is possible that reinforced concrete foundations from former railroad structures will be encountered during soil removal along the shoreline. These foundations will be broken into manageable-sized pieces and stockpiled. If they are clean, the concrete fragments will be used as backfill if possible. Any concrete fragments that cannot be cleaned will be handled as contaminated soil and disposed of at an appropriate facility.

Geosynthetics: Geomembrane and geotextile from previous cleanup activities will be removed and disposed of in a permitted off-Site facility.

Non-Contaminated Soils: Excavated soil along the shoreline will be evaluated in the field similarly to the methods used in the upland areas to determine whether it visually contains LNAPL. Soil containing visible LNAPL or exhibiting a sheen in groundwater will be excavated and disposed appropriately. Excavated soil not requiring treatment would be stockpiled on Site for later use as backfill.

Contaminated Soils: Excavated soils that are deemed to be contaminated will be stockpiled with the upland contaminated soils and will be disposed of off-site at an appropriate facility.

Once the contaminated soil and riprap is removed from the shoreline, the disturbed areas will be backfilled and re-graded to match the existing conditions. The slope of the new shoreline along the river will be protected from erosion by replacing the 5-foot-thick riprap layer with cleaned riprap. If additional riprap material is required, it will be obtained from an acceptable, approved off-site source and will be compatible with the existing Site riprap. An Erosion and Sediment Prevention Plan will also be implemented prior to any work conducted along the shoreline to aid in bank stabilization and prevent contaminated sediment from entering the St. Joe River prior to, during, and after removal activities. This Plan will utilize BMPs that will be designed, implemented, and maintained in order to fully protect and preserve the current beneficial uses of the St. Joe River. The erosion and sediment practices proposed for Avery Landing will meet the general conditions established under the U.S. Army Corps of Engineers Nationwide Permit 20 (Response Operations for Oil and Hazardous Substances) to ensure compliance with State of Idaho water quality standards. Bank stabilization methods that have been selected for the reconstructed shoreline within the Site boundary are discussed in Section 2.9.2.

2.7 Off-Site Disposal

During excavation, petroleum-contaminated soil will be stockpiled in 5,000 CY piles. Samples of the stockpiled soil will be collected and analyzed as necessary to meet the requirements of the disposal facility(s) (see Section 2.8.2).

2.7.1 Petroleum-Contaminated Soil

Petroleum-contaminated soil will be excavated, stockpiled for testing and dewatering, and then loaded into haul trucks for transport to a CERCLA-approved off-Site disposal facility.

2.7.2 Recovered Free Product

Free product that is recovered during the dewatering of the excavation area will be drummed and stored on Site until completion of dewatering. The free product will undergo characteristic testing and be hauled to an appropriately licensed disposal or recycling facility.

2.8 Sampling and Testing Program

The site-specific sampling plan for analytical testing is provided in Appendix B.

2.8.1 Excavation Area Sampling

Prior to backfilling, soil samples will be collected to document conditions along the lateral and vertical extents of the final excavation areas. Limited sampling and laboratory analysis will be conducted to confirm that the field screening method (Section 2.6.1) is an adequate method for determining the limits of excavation and presence of hydrocarbons, and to document post-removal conditions as a baseline for monitored natural attenuation. Prior to backfilling, samples will be collected from the sidewalls and floor of the excavation area once the extent has been reached and field screening indicates that the continued presence of contamination is unlikely.

A sampling grid will be established prior to excavation for the floor and sidewalls. It is recommended that at a minimum, one confirmation sample will be obtained along a grid with intervals consisting of 150 feet (along plume length) by 100 feet (along plume width), as shown on Figure 2-5, which will amount to a total of 18 samples for the estimated plume extent. For the excavation sidewalls, one soil sample will be collected every 300 horizontal feet, at a depth either similar to the documented presence of Site contaminants or at the approximate midpoint between the base of the excavation and the ground surface. One background sample will also be collected outside the estimated plume extent to provide a baseline. Samples shall be a direct grab sample, or, depending on stability of the excavation and access to the selected sample location, may be collected from the bucket of the backhoe performing the excavation. Samples will be collected at a depth of approximately 2 to 6 inches into the exposed surface and containerized as specified by the laboratory with the sample location, date, time, and depth documented. Additional details about sampling and analytical testing are included in Appendix B.

2.8.2 Soil Disposal Characterization Sampling

During excavation, soil will be stockpiled in 5,000 CY piles and will be sampled and analyzed as required by the disposal facility(s).

2.8.3 Water Treatment Confirmation Sampling

2.8.3.1 Testing and Startup Activities

Once the water treatment system is constructed, shakedown and startup activities will be performed to determine if the system is operational, including initial testing. The general startup testing of the temporary water treatment system shall consist of treating a minimum of 50,000 gallons of water collected from the first proposed excavation area. During the startup test, the water treatment system will be operated at the maximum capacity, 250 gpm, until the entire 50,000 gallon batch has been treated. During this time, continuous flow monitoring and pressure readings (collected every 30 minutes at a minimum) shall be recorded from all of the gauges and flow meters, as necessary, in order to demonstrate that the system is operating properly prior to discharging into the St. Joe River. Adjustments will be made to the system as necessary in order to maintain a continuous flow rate of approximately 70 gpm while meeting the operating requirements for each system component. If the water is not suitable for discharge, the water will be recycled to the influent tank and retreated. Startup water samples will be collected at the influent and effluent locations and analyzed under the methods in accordance with Table 2-5.

Table 2-5 Effluent Confirmation Sampling Plan Summary

Parameter	EPA Method Number	Sample Location
Total Polychlorinated Biphenyls (PCBs)	SW-846 Method 8082	Influent/Effluent
Semi-Volatile Organic Compounds (SVOCs) (specific compounds; see Table 2-6)	SW-846 Method 8270	Influent/Effluent
Metals (specific compounds; see Table 2-6)	SW-846 Method 6000 Series	Influent/Effluent

Samples shall be collected multiple times during the startup activities when the system treats approximately 5,000 gallons, 20,000 gallons, and 45,000 gallons. The entire 50,000 gallons of treated water shall be retained in the effluent storage tanks until the analytical results indicate that the treated groundwater meets the discharge requirements. Samples collected during startup and during operational monitoring will be submitted for laboratory testing based on the parameter list presented below. Samples will be grab samples collected both prior to and after treatment to assess the efficiency of the temporary system. Effluent requirements, including allowable concentrations and sampling frequencies, are provided in Table 2-6. The temporary water treatment system is designed to meet the Surface Water Quality Criteria as Specified in The Idaho Administrative Code (2011).

Table 2-6 Effluent Discharge Limits for Avery Landing

Analytes	Discharge Limit (µg/L)(1)	Limit Type Based on Monthly Sample	Sample Type
Benzo[a]anthracene	0.0038	Daily Maximum	Grab
Benzo[a]pyrene	0.0038	Daily Maximum	Grab
Benzo[b]fluorthene	0.0038	Daily Maximum	Grab
Bis(2-ethyl hexyl)phthalate	1.2	Daily Maximum	Grab
Chrysene	0.0038	Daily Maximum	Grab
n-Nitrosodiphenylamine	3.3	Daily Maximum	Grab
Arsenic	10	Daily Maximum	Grab
Cadmium	0.6	Daily Maximum	Grab
Chromium	11	Daily Maximum	Grab
Copper	11	Daily Maximum	Grab
Lead	2.5	Daily Maximum	Grab
Thallium	0.24	Daily Maximum	Grab
Zinc	120	Daily Maximum	Grab
Total PCBs	0.000064	Daily Maximum	Grab

(1) Or lowest obtainable analytical detection level.

Key:
µg/L = micrograms per liter
PCB = polychlorinated biphenyl

2.8.3.2 Operational Testing

Samples from the treatment facility will also be collected on a weekly basis during normal operation of the system to monitor the discharge concentrations. Samples will be collected at the influent and effluent sampling points and tested for the parameters listed in Table 2-5 to ensure the system is meeting the discharge limits presented in Table 2-6. If discharge limits are exceeded, the system will be shut down and be adjusted as necessary. Exceedances will be recorded and reported as required.

2.9 Site Stabilization

Following excavation of contaminated soil, the Site will be backfilled using stockpiled clean overburden and imported clean backfill. To the extent practicable, the Site will be regraded to minimize the need for imported backfill material. The regraded area, and all areas disturbed during construction, will be covered with a minimum of 6 inches of topsoil and seeded.

2.9.1 Seeding and Planting

Preservation of existing vegetation will be achieved to the extent possible; however, revegetation of the Site will be required for those areas impacted by removal activities including excavation, soil/equipment staging, and the installation of access roads. Seeds and plants provided will consist of U.S. Department of Agriculture (USDA) or other local agency-recommended (i.e., U.S. Forest Service or FHWA) native seed mixtures for the area and will be obtained from a commercial source. This seed mixture will be applied using a broadcast method. Seed will be spread on firm soil with a roughened surface. Any areas compacted with vehicle traffic will be disked or roughened prior to seed application. Exposed areas steeper than 3H:1V will require placement of coir matting to minimize erosion.

2.9.2 St. Joe River Shoreline

Reconstruction of the shoreline will occur after excavation activities are completed and the impermeable oil containment barrier has been removed from the Site where appropriate. Limited removal excavation is anticipated to occur only along the shoreline or within the water course that is visually impacted by petroleum contamination. Therefore, reconstruction along the St. Joe riverbanks will be minimal and should be limited to removal and decontamination and/or replacement of disturbed rip-rap, removal of the existing pier, and removal of large debris observed along the Site boundary.

In addition to seeding of the entire area disturbed during construction, USDA- or other local agency-recommended native plantings will be established, and mulch will be placed, along the bank of the St. Joe River, upgradient of the existing riprap. Depending upon the extent and location of the possible restoration activities, a field determination will be made associated with erosion stabilization of the shore bank. Moisture accumulation points, shade cover, and eventual habitat for wildlife will be considered in determining in re-establishing the area.

2.9.3 Monitoring Wells

As described in Section 2.3.3, Existing monitoring wells outside the areas of excavation will be protected as much as possible, and monitoring wells inside the areas of excavation will be decommissioned. Following backfill, new monitoring wells will be installed for use as part of the long-term monitoring plan for the Site.

2.10 General Construction Site Guidelines

BMPs will be employed throughout construction for control of erosion, stormwater, and fugitive dust, and to avoid adverse impacts on wildlife and their habitats. The BMPs to be implemented during this removal action are based on the Catalog of Stormwater Best Management Practices for Idaho Cities and Counties (IDEQ 2005), the U.S. Army Corps of Engineers Nationwide Permit 20, and professional experience. Appendix A includes the General Construction BMP Plan, which summarizes the BMPs that have been selected for use at the Site.

2.11 Site Monitoring and Inspections

2.11.1 BMP Monitoring and Inspections

The objective of BMP monitoring and inspections is to protect the community, workers, and the environment throughout the duration of the removal action. The OSC, ERRS, and START will inspect the Site daily to assess proper mitigation efforts and to ensure that BMPs are in place to achieve this objective.

2.11.2 Air Monitoring

Perimeter air quality will be monitored regularly during construction activities to assess the impact of Site work on the community, workers, and the surrounding environment. DataRAM monitors will be utilized to measure particulate matter (particles less than 10 microns) in the air. The real-time monitors will be placed upwind (background) and downwind of Site activity to determine and record perimeter background and impacted conditions.

2.11.3 Surface Water Quality Monitoring

Surface water quality will be monitored regularly during construction activities. The construction data will be compared to historical data for the St. Joe in the vicinity of the Avery site to assess the impact of Site work on the St. Joe River. The construction monitoring samples will be analyzed for the following parameters:

- pH, electrical conductivity, turbidity, dissolved oxygen, and temperature (using field-portable water quality instrument where possible).

Monitoring will be conducted during construction to identify any water quality problems that may be occurring as a result of construction activities, and to demonstrate compliance with legal and other monitoring requirements, including the water quality criteria and/or targets for the project. Monitoring sample sites will be upstream and downstream of the Site. Water sampling will be complemented by visual inspection of Site conditions. If a water quality problem is indicated from the monitoring results, the results will be used to assist in identification and management of the problem.

2.12 Project Schedule

Contractors will mobilize to the Site in early to mid-May 2012 to begin Site setup. During this setup time, BMPs will be put into place, the Site will be generally prepared for work, and temporary worker lodging will be established. Removal activities will begin early late May or early June 2012 and finish in late September 2012. A proposed schedule follows:

Contractors begin to mobilize and prepare the Site:	Mid-May 2012
Removal activities begin:	Late May 2012
Removal activities are completed:	Early August 2012
Contractors demobilize from Site:	Late September 2012
Final analytical data is received from laboratory:	Mid-October 2012
Draft removal action report submitted to the OSC:	Mid-December 2012
Comments are received on draft report:	Early January 2012
Final removal action report is submitted to the OSC:	Mid-January 2012

Throughout the removal action and especially at the conclusion of cleanup activities and beginning of demobilization, EPA will work closely with Potlatch and its contractors to ensure a smooth and timely transition.

2.13 Roles and Responsibilities

The Avery Landing Site removal action will be performed by EPA and its contractors. Specific details about the groups who will perform the removal action and their responsibilities are provided below.

EPA: The removal action will be managed by the EPA OSC.

ERRS: Environmental Quality Management, Inc., as ERRS contractor to EPA Region 10, will be the cleanup contractor for the removal action. Their primary responsibilities will be to mobilize the personnel, equipment, and supplies necessary to implement the removal action.

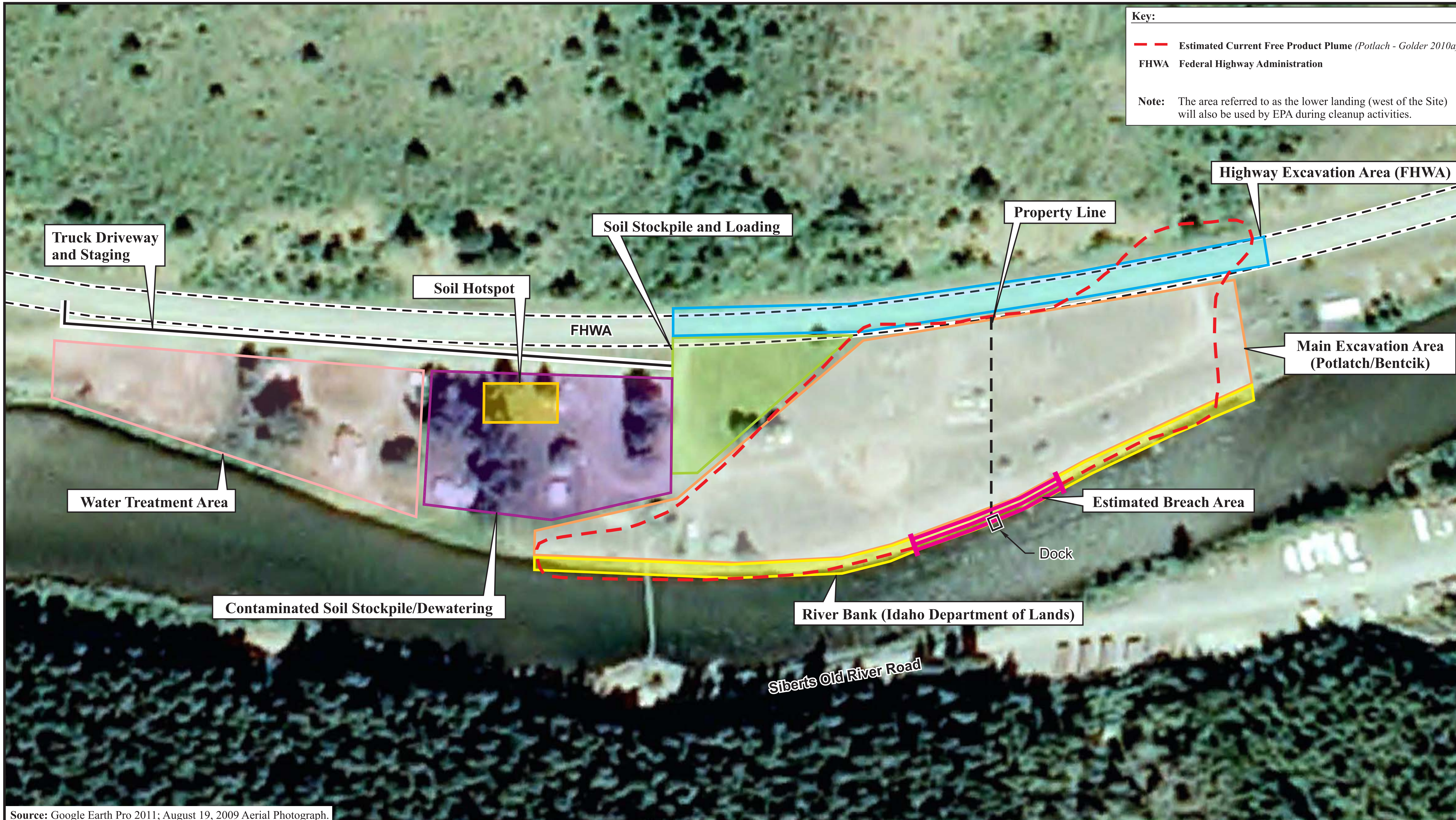
START: E & E, under an EPA Region 10 START contract, will provide on-Site technical assistance and engineering support. START will be responsible for field-screening, collecting analytical samples, and documenting the removal action.

Table 2-7 provides a list of specific duties for the removal action and identifies the group that will be responsible for those duties.

Table 2-7 Summary of Roles and Responsibilities

Task	Group Responsible
Overall management of the removal action	EPA
Implement removal action	ERRS
Improve and maintain access roads during the removal action	ERRS
Implement BMPs	ERRS
Implement Spill Contingency Plan	ERRS
Monitor BMPs	EPA, ERRS, and START
Health and Safety	Each group is responsible for H&S for its own employees
Air monitoring	START
Analytical sampling (excavation or characterization)	START
Field-screening	START
Ship samples to an off-Site laboratory	START
Document Site conditions and methods and results of removal action	START

Key:
BMP = Best Management Practice
EPA = U.S. Environmental Protection Agency Federal On-Scene Coordinator
ERRS = Emergency and Rapid Response Services
H&S = Health and Safety
START = Superfund Technical Assessment and Response Team



ecology and environment, inc.
Global Specialists in the Environment
Seattle, Washington

N

0 112.5 225
Approximate Scale in Feet

AVERY LANDING SITE
Avery, Idaho

Figure 2-1
CONCEPTUAL REMOVAL OPERATIONS AREA

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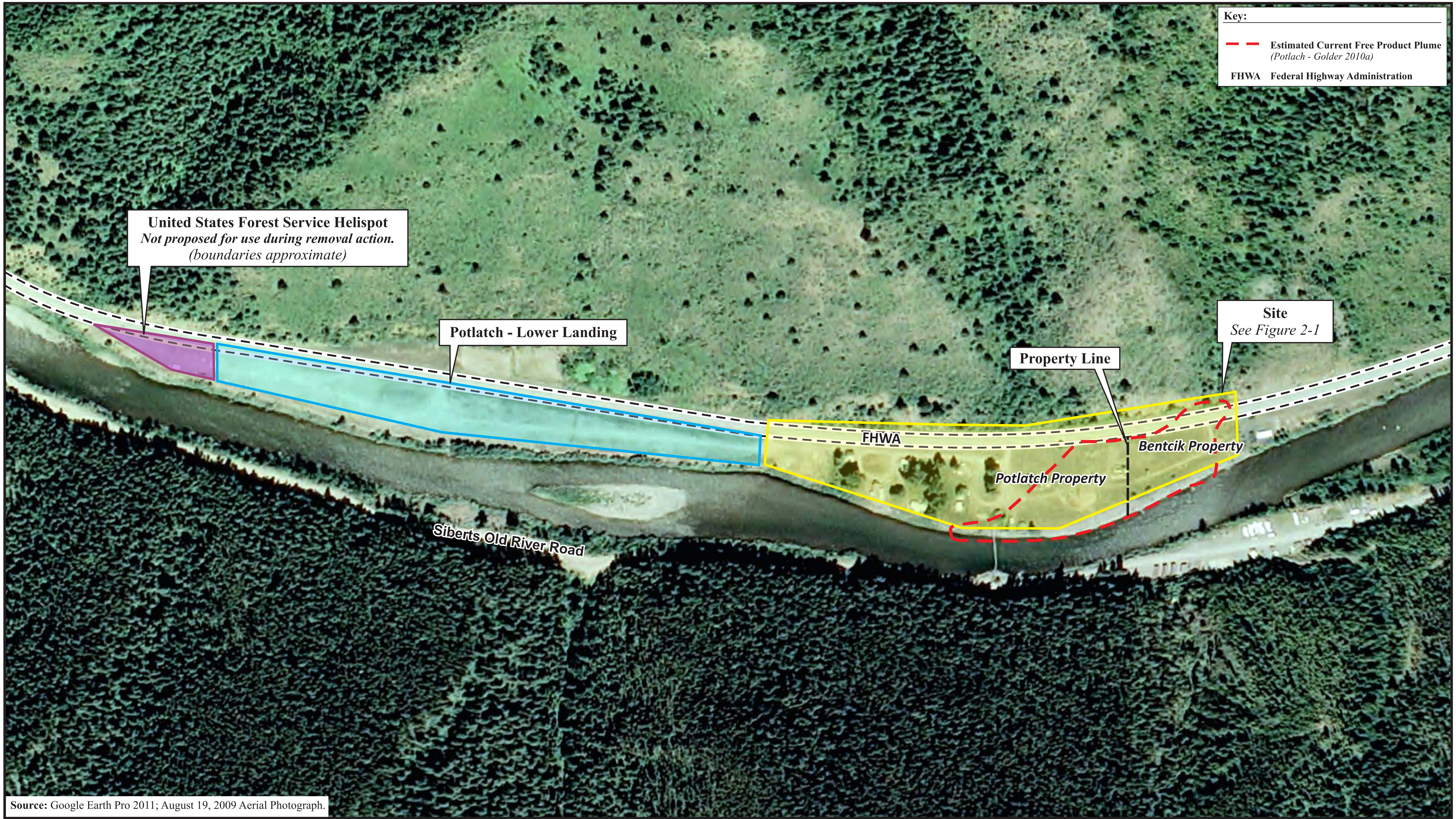

ecology and environment, inc.
Global Specialists in the Environment
Seattle, Washington

0 285 570
Approximate Scale in Feet

AVERY LANDING SITE
Avery, Idaho

Figure 2-2
CONCEPTUAL AVERY LANDING SITE LAYOUT

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Seattle Washington

AVERY LANDING SITE
Avery, Idaho

Figure 2-3
PROPOSED TEMPERARY DETOUR

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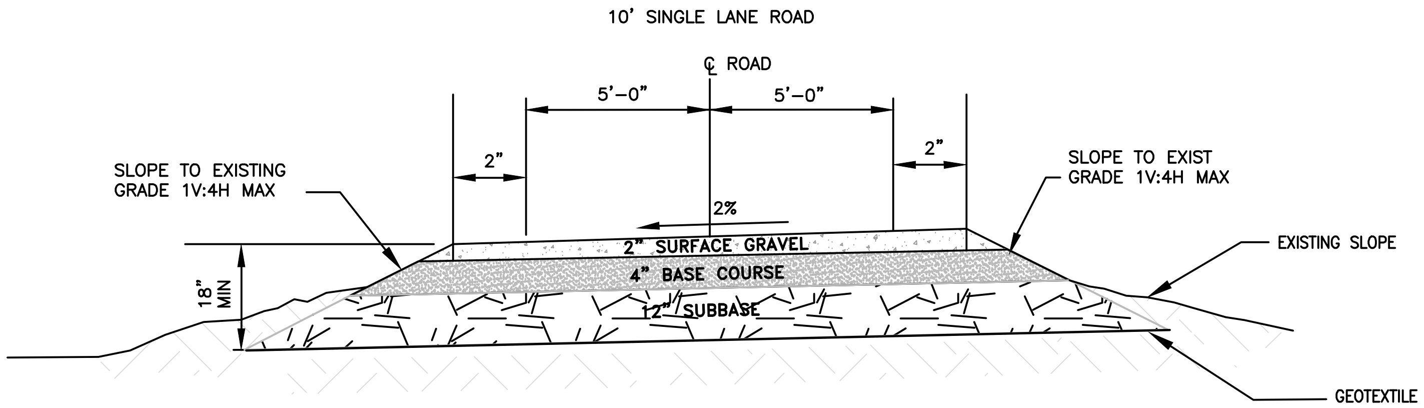
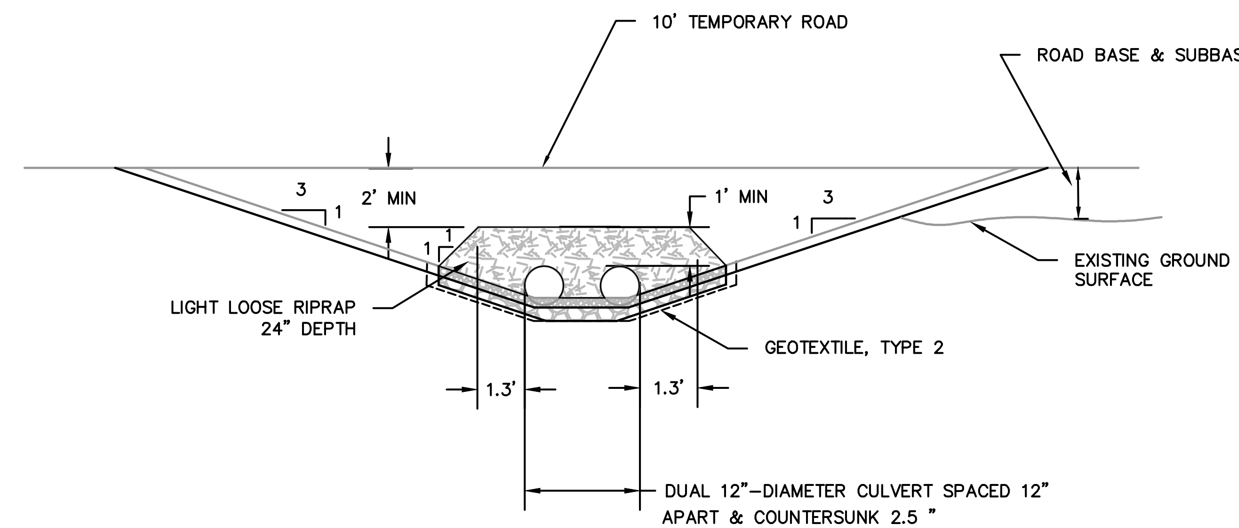


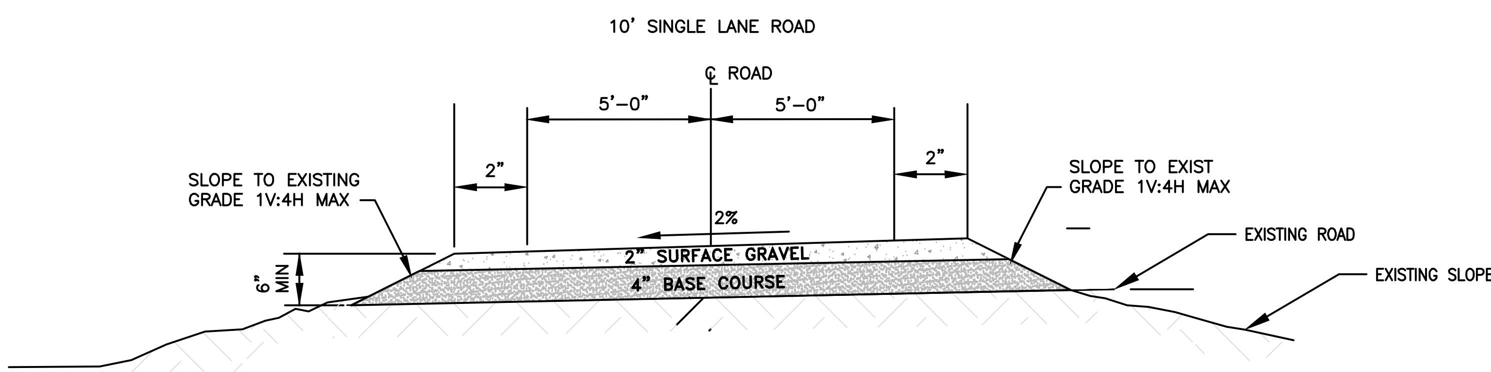
TEMPORARY GRAVEL ROAD SECTION (TYP)
NOT UTILIZING EXISTING ACCESS ROADS
NTS

C2



CULVERT BENEATH TEMPORARY DETOUR ROAD – SECTION
NTS

A
C-X



GRAVEL TEMPORARY ROAD SECTION (TYP)
UTILIZING EXISTING ACCESS ROADS
NTS

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ecology and environment, inc Global Specialist in the Environment Seattle Washington		AVERY LANDING SITE Avery, Idaho	Figure 2-4 TEMPORARY ROAD DETAILS
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LEGEND:

SITE BOUNDARY

EDGE OF WATER

50'

GRID LINES 50' X 50'

CS

CONFIRMATION SAMPLE

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Seattle Washington

N

0 100 200
Approximate Scale in Feet

AVERY LANDING SITE
Avery, Idaho

Figure 2-5
CONFIRMATION SAMPLING GRID

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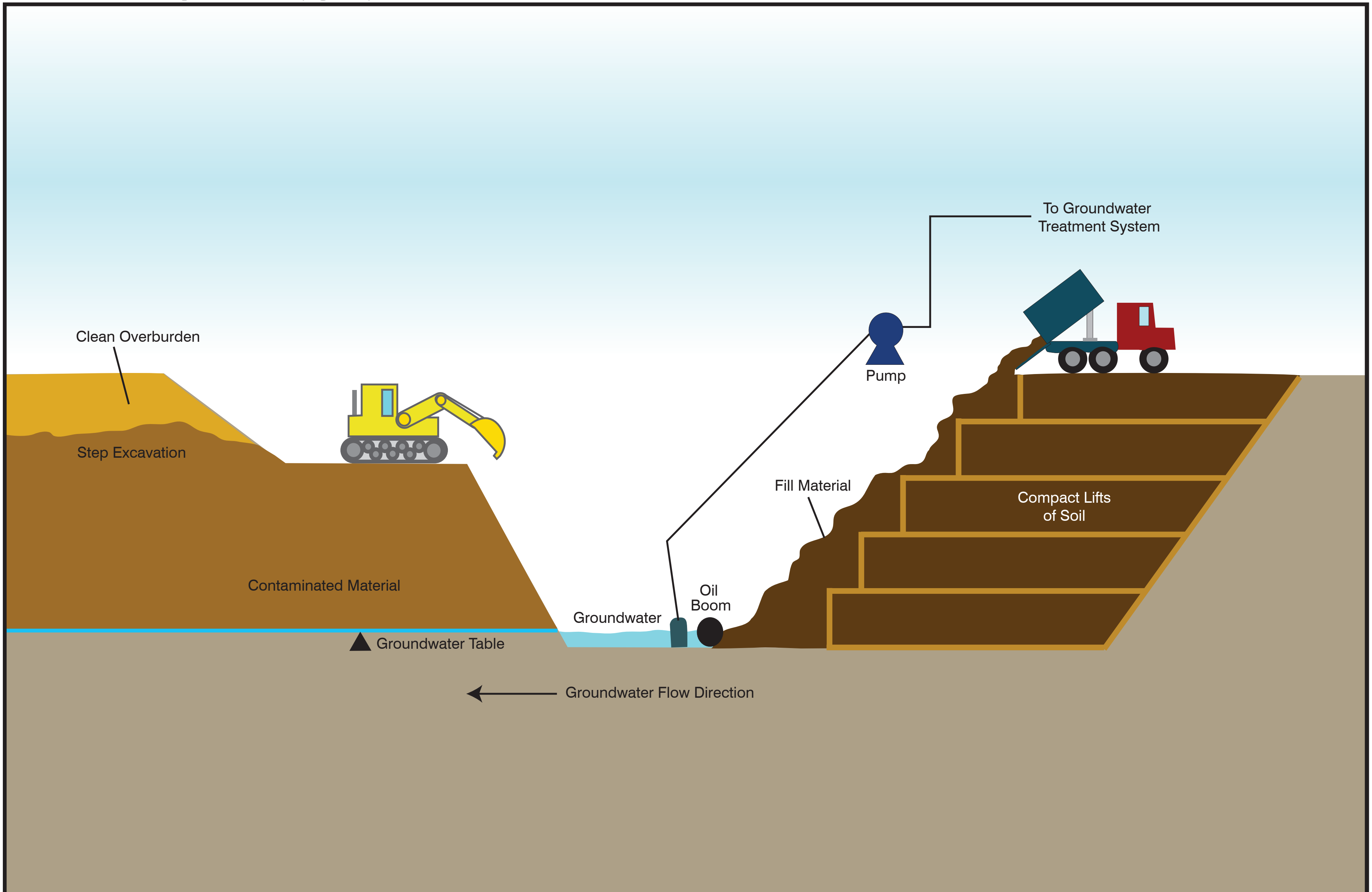

ecology and environment, inc. Global Specialists in the Environment Seattle, Washington	Not to Scale	AVERY LANDING SITE Avery, Idaho	Figure 2-6 CROSS SECTION VIEW OF TYPICAL EXCAVATION AND BACKFILL ACTIVITIES Date: 3/28/12 Drawn by: 10:START-3\08050006\fig 2-6

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3 References

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A General Construction BMP Plan

Erosion and Sediment Control

Erosion and sediment control Best Management Practices (BMPs) will be installed before construction begins. During construction activities, it will be necessary to minimize erosion and introduction of sediments to the St. Joe River. Efforts to achieve this may include the use of silt fence, biofilter bags, fiber rolls, vegetative buffer strips, and/or mulch. Sedimentation traps will be installed to filter stormwater runoff before it exits the Site. Whenever possible, sediment-laden non-contaminated water will be dispersed onto relatively level, vegetated areas to allow for infiltration. Throughout the removal action, activities will be restricted in an effort to preserve existing vegetation, and construction activities will be phased to limit the amount of exposed disturbed soil at any given time. Following construction, all disturbed areas other than existing access roads will be seeded and mulched in a manner appropriate for the area.

Soil Stabilization for Slopes and Disturbed Areas

Coir matting or another equally effective stabilization technique will be implemented on permanent slopes of exposed soil greater than 3H:1V. Following construction, all disturbed areas other than existing access roads will be seeded and mulched in a manner appropriate for the area.

Stabilization of Construction Entrance/Exit

A stabilized construction exit will be installed at the exit from the Site onto Highway 50. The stabilized exit will consist of a pad of crushed rock or stone to limit sediment tracking onto the road from vehicles and heavy equipment leaving the Site.

Stockpile Management

Stockpile management procedures and practices are designed to reduce or eliminate air and stormwater pollution from stockpiles of soil or other construction materials. Soil stockpiles may be temporarily covered with plastic sheeting during non-operational periods at the Site (i.e., nights and weekends). Stockpiles will be located away from concentrated flows of stormwater, drainages, and inlets. Stockpiles will be protected from stormwater runoff using a temporary perimeter sediment barrier such as berms, dikes, silt fences, fiber rolls, sandbags, or gravel bags. Wind erosion control practices will be implemented as appropriate on all stockpiled material. Bagged materials will be placed on pallets and under cover.

Vehicle/Equipment Washing and Maintenance

A vehicle/equipment washing and maintenance system will be installed at the Site. The system will consist of a lined, depressed area to collect heavy equipment wash water, and drain the wastewater into a collection or treatment system. The vehicle/equipment washing and maintenance system will limit the transport of sediment and contaminants off Site.

Spill Contingency Plan

The following Spill Contingency Plan will be implemented to minimize fuel spills and/or to respond immediately in the event that a fuel spill does occur:

- On-Site fuel storage tanks will be placed in a location away from receiving waters and will be surrounded by berms or dikes as secondary containment.
- Drip pans will be used to contain small volumes of leaks, drips, and spills.
- Refueling or machinery maintenance will be conducted at a safe distance from receiving waters.
- Motorized equipment or fuel/oil storage used on Site will be inspected regularly for leaks or impending failure. This inspection will include, but is not limited to, checking fuel hoses, oil drums, oil or transfer valves and fittings.
- An emergency spill response and containment kits containing sorbent boom will be located on Site.
- Each vehicle used on Site will be equipped with a bucket and shovel for use in spill recovery.
- Spilled material and used cleanup materials will be disposed of at an approved disposal facility.

Dust Control

Air quality will be monitored and maintained during construction activities (see Section 2.11.2). Appropriate measures will be taken to prevent dust generation and to monitor work space and perimeter air quality during removal action activities. These BMPs provide increased worker safety and reduce migration of contaminated dusts into surface waters or nearby wildlife habitat.

Dust control measures such as sprinkling or mulching will be implemented on open dry areas of soil, as necessary, and prior to clearing or excavation activities. A water truck will be kept on Site to provide water, which will be sprinkled on the surface of haul roads and other traffic routes to reduce dust levels. Effluent water from the treatment facility can be used for dust suppression as needed. Where appropriate and feasible, mulch or other materials will be used as a longer lasting means of dust control.

Waste Management

A dumpster will be kept on Site for inert construction debris and non-hazardous solid waste. These wastes will be transported off-Site for disposal following construction.

Construction Noise Control

In order to reduce the impact of construction-related noise, removal activities will be performed from 7 a.m. to 6 p.m. Equipment will be maintained in proper working order and equipped with standard noise reduction devices to minimize construction-related noises.

Security

A security guard will be present at the Site full-time whenever construction is not in progress.

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B Site-Specific Sampling Plan

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UNITED STATES ENVIRONMENTAL PROTECTION AGENCY
REGION 10
1200 Sixth Avenue, Suite 900
Seattle, Washington 98101-3140

OFFICE OF ENVIRONMENTAL CLEANUP
EMERGENCY RESPONSE UNIT

Draft Site Specific Sampling Plan

Project Name: _Avery Landing Site________________________________ Site ID: _10FT_______

Author: _Mark Woodke/Steve Hall____ Company:_E & E______________. Date Completed: _3/27/12_

This Site Specific Sampling Plan (SSSP) is prepared and used in conjunction with the Quality Assurance Plan (QAP) for the Emergency Response Unit for collecting samples during this Removal Program project. The information contained herein is based on the information available at the time of preparation. As better information becomes available, this SSSP will be adjusted.

When inadequate time is available for preparing the SSSP in advance of the sampling event, a Field Sampling Form may be prepared on-site immediately prior to sampling. This full length version of the SSSP is written after the sampling event and the completed Field Sampling Form attached to it.

1. Approvals

Name, Title	Telephone, Email, Address	Signature
Earl Liverman, On-Scene Coordinator	208.664.4858, Liverman.earl@epamail.epa.gov, Coeur d'Alene Field Office 1910 Northwest Boulevard, Suite 208 Coeur d'Alene, Idaho 83814	
Kathy Parker **ERU Quality Assurance Coordinator**	206-553-0062, parker.kathy@epa.gov USEPA , M/S: ECL-116, 1200 Sixth Ave. Suite 900, Seattle, WA 98101	

I. Project Management and Organization

2. Personnel and Roles involved in the project:

Name	Telephone, Email, Company, Address	Project Role	Data Recipient
Earl Liverman	208.664.4858, Liverman.earl@epamail.epa.gov, Coeur d'Alene Field Office 1910 Northwest Boulevard, Suite 208 Coeur d'Alene, Idaho 83814	On Scene Coordinator	Yes
Steve Hall	206 624-9537, sghall@ene.com, Ecology and Environment, Inc. (E & E), 720 Third Avenue, Suite 1700, Seattle, WA 98104	Author of SSSP, START Project Manager	Yes
Kathy Parker	206 553 0062, parker.kathy@epa.gov USEPA , M/S: ECL-116, 1200 Sixth Ave. Suite 900, Seattle, WA 98101	ERU Quality Assurance Coordinator	No
Mark Woodke	206-624-9537, mwoodke@ene.com, E & E 720 Third Ave, Suite 1700 Seattle, WA 98104	START Quality Assurance Reviewer	Yes

TBD	TBD	Laboratory contact	No

3. Physical Description and Site Contact Information:

Site Name	Avery Landing Site	
Site Location	The Site is located approximately 0.75 miles west of Avery, Idaho, on the north side of the St. Joe River in the NW quarter of Section 16, Township 45 North, Range 5 East, Willamette Meridian at Latitude 47° 13' 57'' North and Longitude 115° 43' 40'' West. See Figure 1.	
Property Size	Approximately 6 acres. See Figure 2.	
Site Contact	N/A	Phone Number: N/A
Nearest Residents	The eastern portion of the site includes the Bentcik property, a seasonally occupied residence.	Direction: East
Primary Land Uses Surrounding the Site	North: Highway 50 owned by the Federal Highway Administration (FHA) South: St. Joe River (rural/recreational) East: Rural/recreational West: Rural/recreational	

4. The proposed schedule of project work follows:

Activity	**Estimated Start Date**	**Estimated Completion Date**	**Comments**
SSSP Review/Approval	2/3/2012	3/27/2012	
Mobilize to / Demobilize from Site	5/14/2012	9/28/2012	
Sample Collection	5/15/2012	9/21/2012	
Laboratory Sample Receipt	5/16/2012	9/24/2012	Some samples may require Saturday sample receipt.
Laboratory Analysis	5/17/2012	9/25/2012	Some samples may require expedited results.
Data Validation	5/18/2012	10/14/2012	

5. Historical and Background Information

Describe briefly what you know about the site that is relevant to sampling and analysis for this investigation.

The approximate 6-acre Site is located in the St. Joe River Valley in the Bitterroot Mountains of northern Idaho. It is about 0.75 miles west of the town of Avery, Idaho, with a permanent population between of 50 and 60 residents. The Site is composed of the following four contiguous properties, as shown on Figure 2: Federal Highway Administration (FHA) property which includes Highway 50/St. Joe River Road; Bentcik property (eastern half of the Site) including a vacation cottage and monitoring wells; Potlatch property (western portion of the Site) which is generally undeveloped with monitoring wells; and the State of Idaho owns the St. Joe River beds and banks along the southern portion of the Site.

The Site was owned and operated by the Chicago, Milwaukee, St. Paul and Pacific Railroad Company (Milwaukee Road) and was developed in the early 1900s as a railroad switching yard, light maintenance facility, and fueling depot. A thick oil, referred to as 'Bunker C' was frequently used in the early 1900s. With the advent of diesel-powered engines in the 1940s and 1950s, Bunker C was replaced with diesel fuel. Until the 1970s, the Site was used as a railroad switching and maintenance facility for several railway lines. Activities during this time included refueling locomotives, using solvents to clean engine parts, cleaning locomotives and maintaining equipment. Most of the railroad facilities and structures were demolished after the operations ceased at the Site but contamination resulting from Site activities remains onsite in subsurface soils and groundwater based on field investigations conducted in 2007 and 2009.

6. Conceptual Site Model

Example: Contaminant: Mercury
Transport Mechanism: vapor moving on air currents
Receptors: people living in the house

Contaminants: total petroleum hydrocarbons (TPH) diesel (TPH-Dx) and heavy oil, semivolatile organic compounds (SVOCs) including polycyclic aromatic hydrocarbons (PAHs), polychlorinated biphenyls (PCBs), and metals (including arsenic, iron, lead, manganese, and mercury) are present in subsurface soil and groundwater at concentrations above action levels. Volatile organic compounds (VOCs) may also be present at the site.

Transport Mechanisms: These contaminants are transported via groundwater migration towards the St. Joe River.

Receptors: The St. Joe River which is adjacent to the site. The river discharges to Coeur d'Alene Lake via Chatcolet Lake in the Heyburn State Park and is part of the Spokane River Drainage Basin. It is a special resource river that is used for wildlife habitat, recreation, and as drinking water for downstream residents. According to the Idaho Administrative Procedures Act (IDAPA) (IDAPA 58.01.02.110.11), the segment of the St. Joe River adjacent to the Site has the following designations: special resource water, domestic water supply, primary contact recreation, cold water communities, and salmonid spawning. Historically, native game fish in the river include westslope cutthroat trout (*Oncorhynchus clarki lewisi)*, bull trout (*Salvelinus confluentus*), and mountain whitefish (*Prosopium williamsoni*). This section of the St. Joe River has been designated as a catch-and-release fishing area for cutthroat trout. Other species of fish found in the river include bull trout, rainbow trout (*O. mykiss*) and Dolly Varden (*S. malma*).

7. Decision Statement

Examples: 1) Determine whether surface contamination exceeds the established action level;
2) Determine appropriate disposal options for contaminated materials.

The decisions to be made from this investigation are to:

During Excavation Activities

Soil Excavation

1a. Determine if soils in the contaminated area have petroleum contamination. Petroleum-contaminated soil can be identified by the presence of free oil, oil staining, a petroleum odor, the petroleum sheen test (PST), field organic vapor monitoring equipment, or any combination of these.

1b. Determine if soil's TPH-Dx fixed laboratory results in the excavation area correlate with the field screening results during excavation activities. These fixed laboratory analyses will be produced with quick turnaround results.

1c. Determine soil density for fill material.

Surface Water

2. Determine pH, electrical conductivity (EC), turbidity, dissolved oxygen (DO), and temperature of the St. Joe River using field screening during the removal action to determine if the removal action is affecting the surface water.

Air

3. Determine air particulate concentrations during excavation activities using field instruments (DataRams).

Treated Water and Associated Product
4a. Determine treated water results for selected SVOCs (benzo[a]anthracene, benzo[a]pyrene, benzo[b]fluoranthene, bis[2-ethylhexyl]phthalate, chrysene, and n-nitrosodiphenylamine), selected target analyte list (TAL) metals (arsenic, cadmium, chromium, copper, lead, thallium, and zinc), and total PCBs from the first few batches obtained during the excavation and from soil stockpile dewatering at a fixed laboratory with quick turnaround time, then periodic batches of treated water will be analyzed for the same parameters with standard turnaround time for the duration of the removal.
4b. Part of the water treatment system involves collection of product using an oil-water separator. The product will be stored separately from the water and will be disposed of after the analyses required by the disposal facility (to be determined), if any, are performed.

Excavated Soil Stockpiles
5. Determine disposal options for the excavated soils removed from the site. Each stockpile will be allowed to dewater until a representative sample from the pile passes the Paint Filter Liquids Test (PFLT; EPA Method 9095). Excavated contaminated soil in stockpiles will be tested as required by the receiving landfill, including SVOCs, VOCs, PCBs, and Toxicity Characteristic Leaching Procedure (TCLP) Resource Conservation and Recovery Act (RCRA) metals.

After Excavation Activities
Soil Remaining After Excavation
6. Determine final site conditions and determine baseline concentrations for natural attenuation for TPHs, SVOCs, PCBs, and VOCs using a fixed laboratory (TBD) with standard turnaround time.

Groundwater
7. Determine groundwater concentrations of TPHs, SVOCs, PCBs, and VOCs during post-removal groundwater sampling using a fixed laboratory with standard turnaround time.

8. Action Level

State the analyte, concentration, and units for each selected action level. Describe the rationale for choosing each action level and its source (i.e. MTCA, PRG, ATSDR, etc.) Example: The action level for total mercury in soil is 6.7 mg/kg (from Regional Screening Level residential).

Site action levels for the water treatment samples and laboratory reporting limits (TBD) are included in Attachment A.

II. Data Acquisition and Measurement Objectives

9. Site Diagram and Sampling Areas

A Sampling Area is an area within in which a specific action will be performed.
Examples : 1) Each drum on the site is a Sampling Area;
2) Each section of sidewalk in front of the residence is a Sampling Area;
3) Each sampling grid section is a Sampling Area.

Possible sampling areas are included in Figure 2.

Soil Excavation
1a, 1b, and 1c. The contaminated soil and fill material, after excavation is completed, is a sampling area. Excavation activities will extend to the bottom of the light non-aqueous phase liquid (LNAPL) contaminated soil or to a maximum depth of approximately 2 feet below the seasonal low groundwater level (which is an average depth of 17 feet below ground surface [bgs]). Excavation areas will approximately coincide with the grid layout shown in Figure 3. The primary method for determining field screening excavation extents will be the PST, although the presence of free oil or oil staining, a petroleum odor, and/or positive results above background readings on a field organic vapor instrument may also be used depending on field conditions. The procedure for conducting the PST will consist of collecting approximately 50 grams of representative soil at the selected locations within a glass container and applying water to the soil until it is saturated and water collects around the soil. Samples that exhibit a sheen (definite oil film but does not display rainbow) or rainbow sheen (definite oil sheen, film or product that displays rainbow) will be considered contaminated. A passing test will be defined as soil that does not exhibit a sheen or rainbow sheen. If a sheen or rainbow sheen is observed in a sample, or if free oil or oil staining or a petroleum odor is noted or if positive results greater than background are obtained using the field organic vapor instrument, additional excavation will be required and re-screening will be performed until a passing test is achieved. Excavation will stop if the

soil sample passes the visual or field instrument screening tests. Samples will be submitted for fixed laboratory analyses for TPH-Dx analysis periodically during the excavation to ensure that the field results agree with the fixed laboratory results. The excavated area will be filled in using 24-inch lifts and will be compacted with equipment suitable for the soil type and will be subjected to field density testing.

Surface Water
2. Surface water in the St. Joe river is a decision area. Surface water monitoring will be conducted upstream and downstream of the removal action area to determine if the removal action is affecting surface water quality in the river.

Air
3. Air in the area of excavation activities is a decision area. Locations upwind and downwind will be monitored for particulate matter with DataRam field instruments to determine if the removal action is creating particulates that exceed applicable regulatory standards.

Treated Water and Associated Product
4a. The water treatment effluent and recovered product is a decision area. Samples will be collected for selected SVOCs (benzo[a]anthracene, benzo[a]pyrene, benzo[b]fluoranthene, bis[2-ethylhexyl]phthalate, chrysene, and n-nitrosodiphenylamine), selected target analyte list (TAL) metals (arsenic, cadmium, chromium, copper, lea, thallium, and zinc), and total PCBs from the first few batches with a rush turnaround time, and then periodic batches for the rest of the removal.
4b. The product collected from the oil-water separator is a decision area. If required by the receiving facility, samples will be collected to determine disposal options.

Excavated Soil
5. Excavated soil stockpiles are decision areas. Determine disposal options for the excavated soils removed from the site. Each stockpile will be allowed to dewater until a representative sample from the pile passes the PFLT. Excavated contaminated soil in stockpiles will be tested as required by the receiving landfill, including SVOCs, VOCs, PCBs, and TCLP metals.

Soil Remaining After Excavation
6. Soil at the bottom and sides of the excavation area after excavation activities are completed are sampling areas. The samples will be collected to determine final site conditions and determine baseline concentrations for natural attenuation monitoring.

Groundwater
7. Groundwater in and around the perimeter of the site is a decision area. New monitoring wells will be installed at the conclusion of the removal action and TPH, SVOCs, PCBs, and VOCs will be monitored to determine the effectiveness of the removal action.

10. The Decision Rules

These can be written as logical If…, Then.. statements. Describe how the decisions will be made and how to address results falling within the error range of the action level. Examples: 1) In the Old Furnace Sampling Area, the soil in the area around the furnace structure will be excavated until sample analysis with XRF shows no mercury concentrations in surface soil above the lower limit of the error associated with the action level, 18.4 mg/kg. 2) If the concentrations of contaminants in a SA are less than the lower limit of the error associated with the action level, then the area may be characterized as not posing an unacceptable risk to human health or the environment and may be dismissed from additional RP activities. The area may be referred to other Federal, State or Local government agencies.

The following statement(s) describe the decision rules to apply to this investigation:
If the excavated soils indicate the presence of an oil sheen, excavation will continue until the maximum depth of approximately 2 feet below the seasonal low groundwater level is reached.

Soil Excavation
1a and 1b. If the excavated soils do not indicate the presence of an oil sheen, positive PID/FID readings, and/or TPH-Dx contamination, excavation will cease in that area and confirmation samples will be collected.
1c. If the density of the fill material is not within QC limits (approximately 90 percent of maximum relative density), additional compaction will occur until the density is within the limits.

Surface Water
2. If downstream surface water parameters exceed the upstream surface water parameters and the limits

in Attachment A, project activities will be modified using Best Management Practices (BMPs) as listed in Appendix A of the Avery Landing Site Removal Action Work Plan and Conceptual Design until the downstream surface water parameters are less than or equal to the upstream parameters and the limits in Attachment A or until no additional project activity modifications are possible.

Air
3. If air monitoring results exceed the QC limits in Attachment A, additional dust suppression activities using BMPs will occur until the air monitoring results are below the QC limits.

Treated Water and Associated Product
4a. If sample results from the water treatment system exceed the limits provided in Attachment A, water will be rerouted through the treatment system again until acceptable results are achieved. If sample results from the water treatment system are below the limits provided in Attachment A, the water will be allowed to discharge to the St. Joe River.
4b. Product obtained from the water treatment system will be skimmed off and stored and disposed separately from the treated water.

Excavated Soil
5. Determine disposal options for the excavated soils removed from the site. Each stockpile will be allowed to dewater until a representative sample from the pile passes the PFLT. Excavated contaminated soil in stockpiles will be tested as required by the receiving landfill, including SVOCs, VOCs, PCBs, and TCLP metals. If PCB concentrations are greater than 50 mg/kg, incineration or a chemical waste landfill will be the likely disposal options.

Soil Remaining After Excavation
6. If excavation activities are completed (either based on the PST or reaching 2 feet below the mean groundwater depth), soil at the bottom and sides of the excavation area will be sampled to determine final site conditions and baseline concentrations for natural attenuation.

Groundwater
7. Groundwater monitoring wells will be sample to determine final site conditions and baseline concentrations for natural attenuation.

11. Information Needed for the Decision Rule

What information needs to be collected to make the decisions – this includes non-sampling info as well: action levels, climate history, direction of water flow, etc. Examples: Current and future on-site and off-site land use; wind direction, humidity and ambient temperature; contaminant concentrations in surface soil.

The following inputs to the decision are necessary to interpret the analytical results:
Cleanup concentrations (see Attachment A)
Contaminant concentrations in subsurface soil, excavated soil, treated water, surface water, ambient air, groundwater, and product.
Future land and downstream surface water use.

12. Sampling and Analysis

For each SA, describe:

1. *sampling pattern (random, targeted, scheme for composite)*
2. *number of samples, how many to be collected from where, and why*
3. *sample type (grab, composite)*
4. *matrix (air, water, soil)*
5. *analytes and analytical methods*
6. *name and locations of off-site laboratories, if applicable.*

1a and 1b. Soil excavation
A sampling grid will be established prior to excavation for the floor and sidewalls; this grid will be used as a guideline for the soil excavation samples but actual sample locations will be determined in the field by the OSC based on site conditions. At a minimum, one confirmation sample will be obtained along a grid with intervals consisting of approximately 150 feet (along plume length) by approximately 100 feet (along plume width), as shown on Figure 3 which will amount to a total of 18 grab samples for the estimated plume extent. For the excavation sidewalls, one soil sample will be collected approximately every 300 horizontal feet of sidewall at a depth either similar to the documented presence of Site contaminants or at the approximate midpoint between the base of the excavation and the ground surface. An estimated one background sample will also be collected outside the estimated plume extent to provide a baseline. Samples shall be a direct grab sample, or, depending on stability of the excavation and access to the

selected sample location, may be collected from the bucket of the backhoe performing the excavation. Samples will be collected at a depth of approximately 2 to 6 inches into the exposed surface and containerized as specified by the laboratory with the sample location, date, time and depth documented. Field screening using the PST method (or the visual or field instrument methods listed in Section 7.1a) will be the initial method of determining if the soils have petroleum contamination. Each confirmation soil sample will be analyzed for total petroleum hydrocarbons (Ecology Method NWTPH-Dx) at an approved fixed laboratory.

1c. The excavated area will be filled in using 24-inch lifts and will be compacted with equipment suitable for the soil type. At least one field density test for approximately every three lifts will be taken in accordance with ASTM Method D1556. Additional field density tests using ASTM Method D2942 (nuclear density gauge) can be also be used. All density testing will be conducted by a neutral third party engineer subcontracted by ERRS. Excavation will be compacted to approximately 90 percent of maximum relative density.

2. Surface Water
An estimated two representative targeted grab surface water samples will be collected and analyzed daily in the field for pH, EC, turbidity, dissolved oxygen (DO), and temperature (using applicable EPA Quick Start Guides and manufacturer's instructions) of the St. Joe River using field screening during the removal action.

3. Air
Daily targeted continuous air monitoring samples will be collected for particulate matter upwind and downwind from the excavation activities using DataRam monitors following the EPA Quick Start Guide and manufacturer's instructions.

Treated Water and Associated Product
4a. Testing and Startup Activities
Startup
The general startup testing of the temporary water treatment system shall consist of treating a minimum of an estimated 50,000 gallons of water collected from the first proposed excavation area. Targeted grab start-up water samples will be collected from influent and effluent locations and will be analyzed for selected SVOCs (benzo[a]anthracene, benzo[a]pyrene, benzo[b]fluoranthene, bis[2-ethylhexyl]phthalate, chrysene, and n-nitrosodiphenylamine) following EPA Method 8270, selected target analyte list (TAL) metals (arsenic, cadmium, chromium, copper, lead, thallium, and zinc) following EPA Method 6000 series, and total PCBs (EPA Method 8082) at an off-site laboratory. The samples shall be collected multiple times during the start-up activities when the system treats approximately 5,000 gallons, 20,000 gallons, and 45,000 gallons.

Operational testing
Samples from the treatment facility will be collected on an estimated weekly basis during normal operation of the system to monitor the discharge concentrations. An estimated 26 targeted grab samples will be collected and analyzed for selected SVOCs (benzo[a]anthracene, benzo[a]pyrene, benzo[b]fluoranthene, bis[2-ethylhexyl]phthalate, chrysene, and n-nitrosodiphenylamine) following EPA Method 8270, selected TAL metals (arsenic, cadmium, chromium, copper, lead, thallium, and zinc) following EPA Method 6000 Series, and total PCBs following EPA Method 8082 at an off-site laboratory.

4b. Product Samples
Representative targeted grab product sample(s) will be collected from the treated water system and will be analyzed for the parameters required by the disposal facility (to be determined) at an off-site laboratory (TBD). If required for analysis, as many as 10 product samples will be collected during the removal action; the actual quantity will be determined based on the volume of product collected

Excavated soil stockpiles
5. Ten representative random composite soil samples will be collected from the first 2,000 cubic yards of excavated soils, then one representative random composite soil sample will be collected from each stockpile (up to 5,000 cubic yards) after that. Based on the estimated total of 57,000 cubic yards, a total of 21 samples will be collected. Each stockpile will be allowed to dewater until a representative sample from the pile passes the PFLT. Excavated contaminated soil in stockpiles will be tested as required by the receiving landfill, including SVOCs, VOCs, PCBs, and TCLP metals.

Soil Remaining After Excavation

6. An estimated 18 targeted grab soil samples will be collected from the excavation floor and an estimated 7 targeted grab soil samples will be collected from the excavation walls. Samples will be collected at a depth of approximately 2 to 6 inches into the exposed surface and containerized as specified by the laboratory with the sample location, date, time and depth documented. Actual sample quantities will be determined in the field based on site conditions. Each confirmation soil sample will be analyzed for the total petroleum hydrocarbons (Ecology Method NWTPH-Dx), heavy oils (Ecology Method NWTPH-Dx), volatile organic compounds (EPA Method 8260), PCBs (EPA Method 8082), and SVOCs (EPA Method 8270) and shall be analyzed by an approved laboratory (TBD).

Groundwater

7. An estimated 4 to 5 monitoring wells will be installed in and around the excavation area after excavation activities are completed. Targeted grab water samples will be collected quarterly from these monitoring wells and the previously installed upgradient and downgradient monitoring wells for several years after completion of the removal action. The samples will be analyzed for total petroleum hydrocarbons (Ecology Method NWTPH-Dx), heavy oils (Ecology Method NWTPH-Dx), volatile organic compounds (EPA Method 8260), PCBs (EPA Method 8082), and SVOCs (EPA Method 8270) and shall be analyzed by an approved laboratory (TBD).

13. Applicability of Data (place an X in front of the data categories needed, explain with comments)

Do the decisions to be made from the data require that the analytical data be:
1) definitive data, 2) screening data (with definitive confirmation) or 3) screening data (without definitive confirmation)?

_X_***A) Definitive data*** *is analytical data of sufficient quality for final decision-making. To produce definitive data on-site or off-site, the field or lab analysis will have passed full Quality Control (QC) requirements (continuing calibration checks, Method Detection Limit (MDL) study, field duplicate samples, field blank, matrix spikes, lab duplicate samples, and other method-specific QC such as surrogates) AND the analyst will have passed a Precision and Recovery (PAR) study AND the instrument will have a valid Performance Evaluation sample on file. This category of data is suitable for:* ***1) enforcement purposes, 2) determination of extent of contamination, 3) disposal, 4) RP verification or 5) cleanup confirmation.***
Comments: All data provided by off-site laboratories from the treated water, product, excavated soil stockpiles, soils remaining in place after the excavation, surface water, and groundwater will be considered definitive data.

_X_***B) Screening data with definitive confirmation*** *is analytical data that may be used* ***to support preliminary or intermediate decision-making*** *until confirmed by definitive data. However, even after confirmation, this data is often not as precise as definitive data. To produce this category of data, the analyst will have passed a PAR study to determine analytical error AND 10% of the samples are split and analyzed by a method that produced definitive data with a minimum of three samples above the action level and three samples below it.*
Comments: The PST testing results will be confirmed at a commercial laboratory (TBD) using NWTPH-Dx analyses.

_X_***C) Screening data*** *is analytical data which has not been confirmed by definitive data. The QC requirements are limited to an MDL study and continuing calibration checks. This data can be used for making decisions:* ***1) in emergencies, 2) for health and safety screening, 3) to supplement other analytical data, 4) to determine where to collect samples, 5) for waste profiling, and 6) for preliminary identification of pollutants****. This data is not of sufficient quality for final decision-making.*
Comments: Field water quality parameter, field air monitoring, and soil density testing results will be considered screening data.

14. Special Sampling or Analysis Directions

Describe any special directions for the planned sampling and analysis such as additional quality controls or sample preparation issues. Examples: 1) XRF and Lumex for sediment will be calibrated before each day of use and checked with a second source standard. 2) A field blank will be analyzed with each calibration to confirm the concentration of non-detection. 3) A Method Detection Limit determination will be performed prior to the start of analysis so that the lower quantitation limit can be determined. 4) If particle size is too large for accurate analyses, the samples will be ground prior to analysis. If the sample contains too much moisture for accurate analyses, the sample will be decanted and air dried prior to analysis.

Quick turnaround results will be obtained for soil excavation confirmation samples and initial water treatment system samples.

15. Method Requirements

[Describe the restrictions to be considered in choosing an analytical method due to the need to meet specific regulations, policies, ARARs, and other analytical needs. Examples: 1) Methods must meet USEPA Drinking Water Program requirements. 2) Methods must achieve lower quantitation limits of less than 1/10 the action levels.3) Methods must be performed exactly as written without modification by the analytical laboratory.]

Off-site laboratory methods must achieve detection limits less than or equal to the action levels.

16. Sample Collection Information

[Describe any activities that will be performed related to sample collection]

The applicable sample collection Standard Operating Procedures (SOPs) or methods will be followed and include:

Field Activity Logbooks SOP
Sample Packaging and Shipping SOP
Sampling Equipment Decontamination SOP
Soil Sampling SOP
VOC – Soil and Sediment Sampling SOP
Surface Water Sampling SOP
Groundwater Well Sampling SOP
Borehole Installation Methods SOP
Procedure for Handling Investigation Derived Waste SOP
Instrument SOPs: Quick Start Guides and/or Manufacturer's Instructions for field instruments (air monitoring and surface water monitoring instruments to be determined)

17. Optimization of Sampling Plan (Maximizing Data Quality While Minimizing Time and Cost)

[Describe what choices were made to reduce cost of sampling while meeting the needed level of data quality. Example: The XRF will be used in situ whenever possible to achieve accurate results. Reproducibility and accuracy of in situ XRF analyses will be checked by collecting, air drying, analyzing and comparing five in situ samples at the start of sampling. Where interferences are suspected, steps will be taken to eliminate the interferences by mechanisms such as drying, grinding or sieving the samples or analyzing them using the Lumex with soil attachment.]

Field screening will be conducted for excavation soils, for surface water parameters, and for ambient air.

The format for sample number identification is summarized in Table 1. Sample collection and analysis information is summarized in Table 2.

Table 1 SAMPLE CODING **Project Name:** _Avery Landing Site______________________________ **Site ID:** _10FT__		
SAMPLE NUMBER [(1)]		
Digits	**Description**	**Code (Example)**
1,2,3,4	Year and Month Code	1205 (YYMM)
5,6,7,8	Consecutive Sample Number (grouped by SA as appropriate)	0001 (First sample of SA)

SAMPLE NAME / LOCATION ID [(2)] ***(Optional)***		
1,2	Sampling Area	BG – Background ES – Excavation soil SS - Soil stockpiles TW - Treated Water SW - Surface Water AA – Ambient Air MW – Monitoring Well RS – Rinsate TB – Trip Blank
3,4	Consecutive Sample Number	01 – First sample of Sampling Area
5,6	Matrix Code	AR – Air GW – Groundwater PR – Product SB – Subsurface Soil SD – Sediment SS – Surface Soil SW – Surface Water QC – Quality Control WT – Water
7,8	Depth (Optional)	01 (feet below ground surface)

Notes:
(1) The Sample Number is a unique, 8-digit number assigned to each sample.
(2) The Sample Name or Location ID is an optional identifier that can be used to further describe each sample or sample location.

Table 2. Sampling and Analysis

Data Quality	Sampling Area	Matrix	Sampling Pattern	Sample Type	Data Quality	Estimated Number of Field Samples	Analyte or Parameter	Method Number	Action Level	Method Quant. Limit	#/type of Sample Containers per Sample	Preservative (Ice for all)	Hold Time (to analysis or to extraction/to analysis)	Field QC
Field Analysis	Soil Excavation	Soil	Targeted	Grab	Screening+ Confirm.	120	Petroleum Sheen Test (PST) Visual Observation Petroleum Odor PID/FID	NA	Presence of Oil Sheen Presence of oil Petroleum odor Result above background	NA NA NA 1 ppm	1x2 ounce glass jar for all analyses	NA NA NA NA	NA NA NA NA	12 Duplicates
Lab Analysis	Soil Excavation	Soil	Targeted	Grab	Definitive	18	Diesel Range TPHs	NWTPH-Dx	NA	25 mg/kg	1x8 ounce glass	Ice	14/40 days	2 Duplicates
Field Analysis	Soil Excavation	Soil	Targeted	Grab	Screening	20	Density	ASTM D1556 and/or D2942	<90% of maximum relative density	1% of maximum relative density	NA/NA	NA	NA	2 Duplicates
Field Analysis	St Joe River	Water	Targeted	Grab	Screening	240	pH Electrical Conductivity Turbidity Dissolved oxygen Temperature	QSG QSG QSG QSG QSG	$\pm$ 10% of upstream	0 Units 0 mS/cm 0 NTU 0 mg/L 0 ^{o}C	NA/NA	NA	NA	24 Duplicates
Field Analysis	Site Perimeter	Air	Targeted	Grab	Screening	240	Particulate Matter	QSG	> 2x upwind	0.0001 mg/m^3	NA/NA	NA	NA	NA
Lab Analysis	Treated Water	Water	Targeted	Grab	Definitive	60 Quick TAT / 65 Standard TAT	Select SVOCs Select Target Analyte List Metals Polychlorinated Biphenyls	EPA 625 EPA 200.8 EPA 608	See Attachment A	5 ug/L 5 ug/L 1 ug/L	2x1 L Amber 1x1 L Poly 2x1 L Amber	NA HNO3 to pH<2 Ice	7/40 days 6 months 7/40 days	12 Duplicates 12 Duplicates 12 Duplicates
Lab Analysis	Product	Product	Targeted	Grab	Definitive	20	TBD by the disposal facility	TBD	TBD	TBD	TBD	NA	NA	1 Duplicate per analysis
Lab Analysis	Soil Stockpiles	Soil	Targeted	Grab	Definitive	21	Paint Filter Liquid Test (PFLT) SVOCs	EPA 9095 EPA 8270	Pass/Fail NA	NA 1 mg/kg	1x8-ounce glass jar 1x8-ounce	NA NA	NA 14/40 days	2 Duplicates 2 Duplicates

											glass jar			
							VOCs	EPA 8260	NA	1 mg/kg	3xEnCore	NA	48 hours/ 14 days	2 Duplicates
							PCBs	EPA 8082	50 mg/kg	1 mg/kg	1x8- ounce glass jar	NA	14/40 days	2 Duplicates
							TCLP RCRA Metals	EPA 1311/6000/ 7000 Series	0.2 – 100 mg/L	0.1 – 10 mg/L	1x8- ounce glass jar	NA	6 months (28 days for mercury)	2 Duplicates
Lab Analysis	Soil After Excavation	Soil	Targeted	Grab	Definitive	54	Diesel Range TPHs	NWTPH- Dx	NA	25 mg/kg	1-8 ounce glass jar	NA	14/40 days	3 Duplicates
							SVOCs	EPA 8270 EPA 8260	NA	1 mg/kg	1-8 ounce glass jar	NA	14/40 days	3 Duplicates
							VOCs	EPA 8082	NA	1 mg/kg	3xEnCore Samplers	NA	48 hours/ 14 days	3 Duplicates
							Polychlorinated Biphenyls		NA	1 mg/kg	1-8 ounce glass jar	NA	14/40 days	3 Duplicates
Lab Analysis	Groundwater	Water	Targeted	Grab	Definitive	7	Diesel Range TPHs	NWTPH- Dx	NA	250 ug/L	2x32 ounce amber	NA	7/40 days	1 Duplicate
							SVOCs	EPA 8270 EPA 8260	NA	10 ug/L	2x32 ounce amber	NA	7/40 days	1 Duplicate
							VOCs	EPA 8082	NA	10 ug/L	2x40 mL VOA	HCl to pH <2	14 days	1 Duplicate
							Polychlorinated Biphenyls		NA	1 ug/L	2x32 ounce amber	NA	7/40 days	1 Duplicate

Note: For matrix spike and/or duplicate samples, no extra volume is required for air (unless co-located samples are collected), oil, product, or soil samples except soil VOC or NWTPH-Gx samples (triple volume). Triple volume is also required for organic water samples (double volume for inorganic).

Table 3. Common Sample Handling Information

Analysis Type	Sub Analysis	Matrix	Analytical Method	Container Type	Minimum Volume	Preservative	Temperature/ Storage	Hold Time	Source
Metals	Metals Not including Mercury or Hexachrome. Includes TAL, PP, RCRA lists)	Solid	EPA 6000 / 7000 Series	Glass Jar	200 g	n/a	None	6 months	SW-846 ch. 3
		Aqueous	EPA 6000 / 7000 Series	PTFE or HDPE	600 mL	HNO_3 to pH < 2	Not listed	6 months	SW-846 ch. 3
	Mercury	Solid	EPA 7471B	Glass Jar	200 g	n/a	$\leq 6^{o}$ C	28 days	SW-846 ch. 3
		Aqueous	EPA 7470A	PTFE or HDPE	400 mL	HNO_3 to pH < 2	Not listed	28 days	SW-846 ch. 3
	Hexavalent Chromium, (Hexachrome, Cr+6)	Solid	Lab-specific soil extraction modification, EPA 7196A	Glass Jar	100 g	n/a	$\leq 6^{o}$ C	28 days to extraction	SW-846 ch. 3
		Aqueous	EPA 218.6 (Drinking Water)	PTFE or HDPE	400 mL	n/a	$\leq 6^{o}$ C	24 hours	SW-846 ch. 3
	XRF	Solid (in situ; on the ground surface)	6200	none	n/a	None	none	Analyze Immediately	n/a
		Solid (ex situ)	6200	plastic bag	200 g	None	none	6 months	n/a
VOCs	VOCs / BTEX	Solid	EPA 5035 / 8260B	*	*	*	*	2 days to lab / 14 days	SW-846 ch. 4
		Aqueous	EPA 8260B	Amber Vial with Septa Lid	2 x 40 mL	HCl to pH< 2	$\leq 6^{o}$ C (headspace free)	14 days	SW-846 ch. 4
SVOCs	SVOCs / PAHs	Solid	EPA 8270D	Glass Jar	8 ounces	n/a	$\leq 6^{o}$ C	14 days	SW-846 ch. 4
		Aqueous	EPA 8270D	Amber Glass	2 x 1 L	n/a	$\leq 6^{o}$ C	7 days	SW-846 ch. 4
PCBs and Dioxins/Furans	PCBs	Solid	EPA 8082	Glass Jar	8 ounces	n/a	$\leq 6^{o}$ C	none	SW-846 ch. 4
		Aqueous	EPA 8082	Amber Glass	2 x 1 L	n/a	$\leq 6^{o}$ C	none	SW-846 ch. 4
	Dioxins/Furans	Solid	EPA 8280 or 8290	Glass Jar	8 ounces	n/a	$\leq 6^{o}$ C	none	SW-846 ch. 4
		Aqueous	EPA 8280 or 8290	Amber Glass	2 x 1 L	n/a	$\leq 6^{o}$ C	none	SW-846 ch. 4
Pesticides and Herbicides	Chlorinated Pesticides	Solid	EPA 8081	Glass Jar	8 ounces	n/a	$\leq 6^{o}$ C	14 days	SW-846 ch. 4
		Aqueous	EPA 8081	Amber Glass	2 x 1 L	n/a	$\leq 6^{o}$ C	7 days	SW-846 ch. 4
	Chlorinated Herbicides	Solid	EPA 8151	Glass Jar	8 ounces	n/a	$\leq 6^{o}$ C	14 days	SW-846 ch. 4
		Aqueous	EPA 8151	Amber Glass	2 x 1 L	n/a	$\leq 6^{o}$ C	7 days	SW-846 ch. 4
NWTPH	Gasoline-Range Organics	Solid	TPHs/NWTPH-Gx	Amber Glass Jar with Septa Lid	4 ounces	n/a	$\leq 6^{o}$ C (headspace free)	14 days	Method
		Aqueous	TPHs/NWTPH-Gx	Amber Vial with Septa Lid	2 x 40 mL	pH < 2 with HCl	$\leq 6^{o}$ C (headspace free)	7 days unpreserved 14 days preserved	Method
	Diesel-Range Organics	Solid	3510, 3540/3550, 8000	Glass Jar	8 ounces	n/a	$\leq 6^{o}$ C	14 days	Method

Analysis Type	Sub Analysis	Matrix	Analytical Method	Container Type	Minimum Volume	Preservative	Temperature/ Storage	Hold Time	Source
		Aqueous	3510, 3540/3550, 8000	Glass Amber	2 x 1 L	pH < 2 with HCl	$\leq$ 6^{o} C	7 days unpreserved 14 days preserved	Method
Geotechnical	Particle Size Analysis	Solid	ASTM D-422	Glass Jar or Plastic Bag	2 x 8 ounce	None	n/a	n/a	Method
Miscellaneous	pH	Solid	EPA 9045	Glass Jar	8 ounces	n/a	n/a	Analyze Immediately	SW-846 ch. 3
		Aqueous	EPA 9040	PTFE	25 mL	n/a	n/a	Analyze Immediately	SW-846 ch. 3
	Total Organic Carbon (TOC)	Solid	SW-846 9060	Glass Jar	100 mL	n/a	$\leq$ 6^{o} C	28 days	SW-846
		Aqueous	EPA 415.1	PTFE or HDPE	200 mL	store in dark HCL or H_2SO_4 to pH <2	$\leq$ 6^{o} C	7 days unpreserved 28 days preserved	Method
	Cyanide	Solid	SW-846 9013	Glass Jar	5 g	n/a	$\leq$ 6^{o} C	14 days	SW-846 ch. 3
		Aqueous	SW-846 9010C	PTFE or HDPE	500 mL	NaOH to pH > 12	$\leq$ 6^{o} C	14 days	SW-846 ch. 3
	Conductivity	Aqueous	EPA 120.1	PTFE or HDPE	100 mL	n/a	n/a	Analyze Immediately	Method
	Hardness	Aqueous	EPA 130.1	PTFE or HDPE	1 x 1 L	HNO3 to pH<2	$\leq$ 6^{o} C	28 days	Method
	Total Suspended Solids	Aqueous	EPA 160.2	PTFE or HDPE	100 mL	n/a	$\leq$ 6^{o} C	7 days	Method
	Total Dissolved Solids	Aqueous	EPA 160.1	PTFE or HDPE	100 mL	n/a	$\leq$ 6^{o} C	7 days	Method
	Nitrate/nitrite	Aqueous	EPA 353.2	PTFE or HDPE	1 x 250 mL	H_2SO_4 to pH <2	$\leq$ 6^{o} C	28 days	Method
	Nitrate	Aqueous	SW-846 9210A	PTFE or HDPE	1,000 mL	n/a	$\leq$ 6^{o} C	28 days	SW-846 ch. 3
	Nitrite	Aqueous	SW-846 9216	PTFE or HDPE	25 mL	n/a	$\leq$ 6^{o} C	48 hours	SW-846 ch. 3, Method
	Fluoride	Aqueous	SW-846 9214	PTFE or HDPE	300 mL	n/a	$\leq$ 6^{o} C	28 days	SW-846 ch. 3
	Chloride	Aqueous	SW-846 9250	PTFE or HDPE	50 mL	n/a	$\leq$ 6^{o} C	28 days	SW-846 ch. 3
	Sulfate	Aqueous	SW-846 9035	PTFE or HDPE	50 mL	n/a	$\leq$ 6^{o} C	28 days	SW-846 ch. 3
	Sulfide	Solid	SW-846 9215	Glass Jar	1 x 4 ounces	Fill sample surface with 2N zinc acetate until moistened.	$\leq$ 6^{o} C (headspace free)	7 days	SW-846 ch. 3
		Aqueous	SW-846 9031	PTFE or HDPE	100 mL	4 drops 2N zinc acetate/100 mL sample; NaOH to pH>9.	$\leq$ 6^{o} C (headspace free)	7 days	SW-846 ch. 3

Key:

*	= See individual methods. We typically collect 3xEnCore-type samplers and 1x40 mL VOA vial per sample, keep at $\leq$ 6^{o}C with no chemical preservative, and they must be at the lab within 48 hours of collection.				
C	= Celsius	HNO_3	= nitric acid	SVOCs	= semivolatile organic compounds
Cr	= chromium	L	= liter	SW-846	= EPA Test Methods for Evaluating Solid Waste, Physical/Chemical Methods
EPA	= Environmental Protection Agency	mL	= milliliter	TAL	= Target Analyte List
g	=grams	n/a	= not applicable	TPH	= total petroleum hydrocarbons
H2SO4	= sulfuric acid	NaOH	= sodium hydroxide	VOA	= Volatile Organic Analysis
HCL	= hydrochloric acid	PCBs	= polychlorinated biphenyls	VOCs	= Volatile Organic Compounds
HDPE	= high-density polyethylene	PTFE	= polytetrafluoroethylene		
Hg	= mercury	RCRA	= Resource Conservation and Recovery Act		

III. Assessment and Response

A Sample Plan Alteration Form (SPAF) will be used to describe project discrepancies (if any) that occur between planned project activities listed in the final SSSP and actual project work. The completed SPAF will be approved by the OSC and QAC and appended to the original SSSP.

A Field Sampling Form (FSF) may be used to capture the sampling and analysis scheme for emergency responses in the field and then the FSF pages can be inserted into the appropriate areas of the final SSSP.

Corrective actions will be assessed by the sampling team and others involved in the sampling and a corrective action report describing the problem, solution, and recommendations will be forwarded to the OSC and the ERU QAC.

IV. Data Validation and Usability

The sample collection data will be entered into Scribe and Scribe will be used to print lab Chains of Custody. Results of field and lab analyses will be entered into Scribe as they are received and uploaded to Scibe.net when the sampling and analysis has been completed.

18. Data Validation or Verification will be performed by:

ERU's general recommendation on validation is that a minimum of CLP-equivalent stage IIA verification and validation be performed for every SSSP involving laboratory analyses. However, stage IIB is preferred if the lab can provide it. Dioxins should be validated at CLP-equivalent stage 4.

	Data Verification and Validation Stages						
Performed by:	I	IIA	IIB	III	IV	Verification	Other:
E and E QA Reviewer	100% (Field Lab)		100% (Fixed Lab)		10% (Fixed Lab)		
TechLaw QA Reviewer							
EPA Region 10 QA Office							
MEL staff							
Other:							

ATTACHMENT A

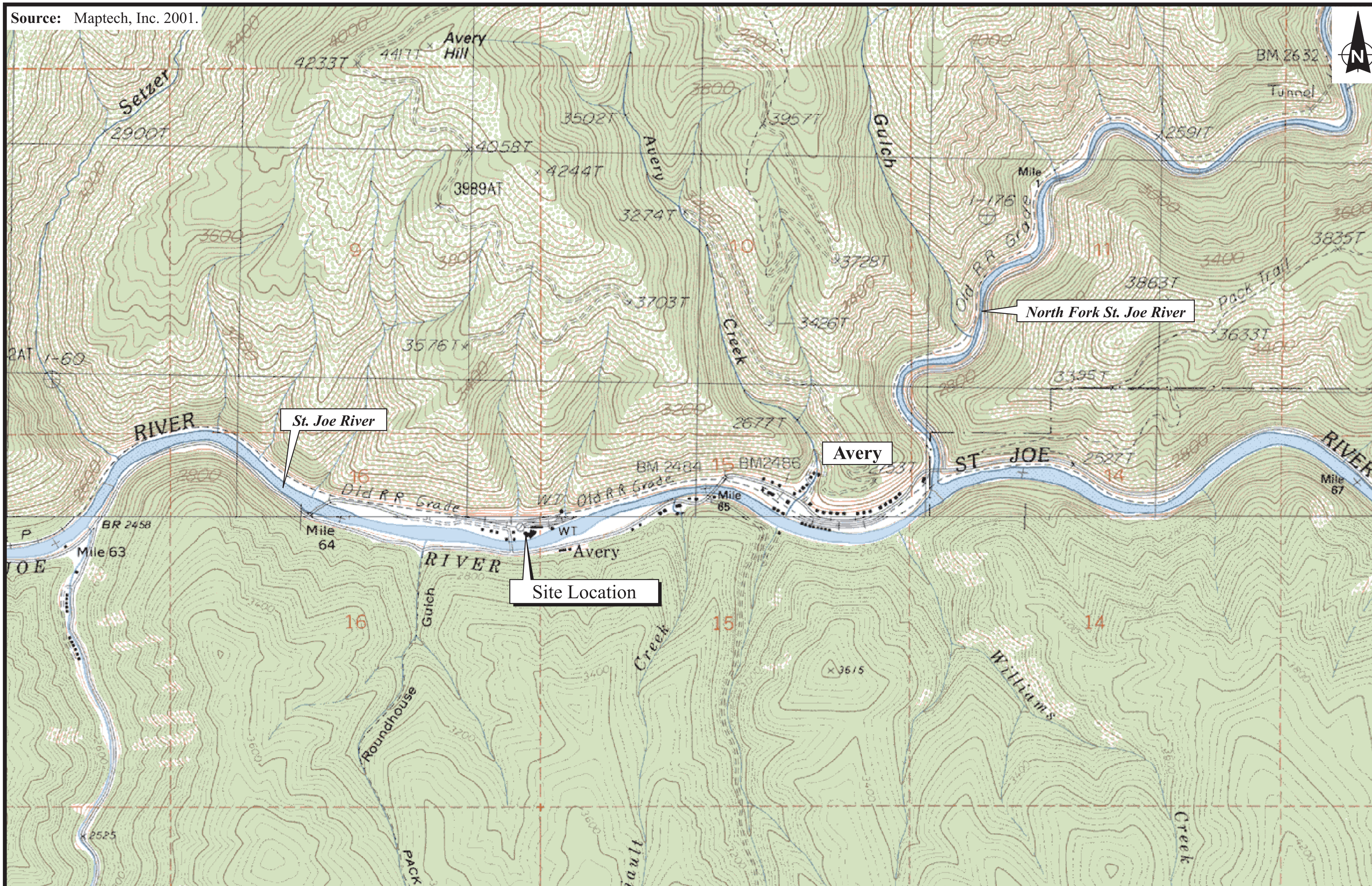
Action Levels

Water Treatment System Effluent Discharge Limits

Analytes	Discharge Limit µg/L	Limit Type Based on Monthly Sample	Sample Type
Benzo[a] Anthracene	0.0038	Daily Maximum	Grab
Benzo[a]pyrene	0.0038	Daily Maximum	Grab
Benzo[b]fluoranthene	0.0038	Daily Maximum	Grab
Bis(2-ethyl hexyl)phthalate	1.2	Daily Maximum	Grab
Chrysene	0.0038	Daily Maximum	Grab
n-Nitrosodiphenylamine	3.3	Daily Maximum	Grab
Arsenic	10	Daily Maximum	Grab
Cadmium	0.6	Daily Maximum	Grab
Chromium	11	Daily Maximum	Grab
Copper	11	Daily Maximum	Grab
Lead	2.5	Daily Maximum	Grab
Thallium	0.24	Daily Maximum	Grab
Zinc	120	Daily Maximum	Grab
Total PCBs	0.000064	Daily Maximum	Grab

Other Action Levels

Analytes	Limit	Sample Type
pH	Downstream reading ± 10% of upstream reading	Grab
Electrical Conductivity	Downstream reading ± 10% of upstream reading	Grab
Turbidity	Downstream reading ± 10% of upstream reading	Grab
Dissolved oxygen	Downstream reading ± 10% of upstream reading	Grab
Temperature	Downstream reading ± 10% of upstream reading	Grab



ecology and environment, inc.
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Seattle, Washington

AVERY LANDING SITE
Avery, Idaho

0 1000 2000
Approximate Scale in Feet

Figure 1
SITE LOCATION MAP

Date: 3/7/12

Drawn by: AES

10:START-3\08050006\fig 1

Source: Golder 2010a.

Note: Aboveground structures have been removed except for the Bentcik seasonal residence and the AST and nearby shed.

LEGEND

Property Line & Section 16-15 Division Line

Site Boundary

ecology and environment, inc.
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Seattle, Washington

0 140
APPROXIMATE SCALE IN FEET

N

AVERY LANDING SITE
Avery, Idaho

Figure 2
SITE LAYOUT MAP

Date:	Drawn by:	
3/7/12	AES	10:START-3\08050006\fig 2

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LEGEND:

SITE BOUNDARY

EDGE OF WATER

50' GRID LINES 50' X 50'

CS CONFIRMATION SAMPLE

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Seattle Washington

N

0 100 200
Approximate Scale in Feet

AVERY LANDING SITE
Avery, Idaho

Figure 3
CONFIRMATION SAMPLING GRID

Date:	Drawn by:	
2/10/12	VG	10:START-3\08050006\fig 3

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C On-Site Traffic Control Plan

The Emergency and Rapid Response Services (ERRS) Contractor will prepare a detailed on-Site traffic control plan (TCP). The TCP will name the individual employee who has overall traffic control responsibilities. The TCP will also include drawings for each separate case where traffic flow will be interrupted or altered showing all traffic control devices. The TCP should work in conjunction with the Traffic Management Plan (TMP) prepared in accordance with Federal Highway Administration and Idaho Transportation Department guidelines. It is the intent to require the Contractor to maintain excellent safety conditions for his workers, the public (drivers and pedestrians), and all vehicles.

Anticipated interference with traffic includes:

1. Placing, removing, and maintaining traffic control devices.
2. Traffic entering and leaving the support or construction areas. This includes trucks making deliveries and equipment being loaded and unloaded.
3. Relocating personnel, materials, or equipment from one side of Highway 50 to another.
4. Connection to or protection of utilities located near the highway.
5. Surveying of the roadway.

Within the safety requirements, the intent is to minimize inconvenience to the public. Additionally, emergency vehicles shall be given the right-of-way in all situations.

In conditions where hazardous conditions created by the Contractor's operation are not controlled by traffic control standards or designs, work should stop until the activity has been made a part of the TCP.

Traffic Control Devices

Products specified within this appendix will be removed from the property when no longer needed. Items such as safety vests, flags or signs for flagmen, and communication devices should be standard and adequate for the intended function. ANSI/ASSE A10.47-2009: Work Zone Safety for Highway Construction Standard will be adhered to.

Maintenance
Any traffic control barrier that has become ineffective due to damage or defacement will be replaced. All traffic control devices will be kept clean and neat. Barricades and/or cones used for channelization or delineation and warning signs should be sequentially placed in the direction of the traffic flow and removed in reverse order. Temporary traffic control devices will remain in place only as long as they are needed and will be removed as soon as practical.

Personnel
The ERRS contractor will furnish the name of the individual in his direct employ who is to be responsible for the installation and maintenance of traffic control for the project. If the actual installation and maintenance are to be accomplished by a subcontractor, it will not relieve the ERRS contractor of the requirement for a responsible individual in his direct employ.

Operations
When a section of the road is closed for construction activities, such as moving personnel, materials, or equipment from one side of Highway 50 to another, traffic shall be stopped in both directions for safe passage. The ERRS contractor will protect workers and the public by furnishing, erecting, and maintaining signs, markers, barricades, warning lights, flaggers, and other traffic control devices or personnel for the type of operation being performed. The number, size, color, size, and placement of all traffic control devices should conform to the TCP and the Manual on Uniform Traffic Control Devices.

All vehicles and/or non-operating equipment parked for two hours or less during working hours will be 8 feet from the moving traffic lane. During non-working hours, all materials and equipment shall be stored a minimum of 30 feet from the pavement, or behind man-made or natural barriers when such barriers are adjacent to the traffic lane of the work area. Stored materials or equipment within 15 feet of any roadway is prohibited.

Whenever trucks or other equipment turn off a public street, the ERRS contractor shall ensure that the trucks or equipment do not stop and block or otherwise protrude into the shoulder or lane of traffic. Provide flaggers whenever turning of trucks or other equipment is occurring.

Except in special circumstances, personnel will not cross the roadway on foot. Crossing should be performed in vehicles only. All vehicles and equipment operating on public streets, other than equipment crossings, shall be licensed.

D Groundwater Calculations

DRAFT TECHNICAL MEMORANDUM

Date: January 25, 2012

Subject: Groundwater Flow Rate Estimate for Dewatering

This memorandum provides estimates of the flow rates and volume of groundwater that are anticipated to result from dewatering activities within excavation areas at the Avery Landing Site (Site). Any water collected at the Site will be assumed to be contaminated and will require treatment prior to disposal. It is necessary to calculate the groundwater rates in order to properly design the treatment system to ensure that it has adequate capacity to process wastewater continuously. Currently, limited information has been obtained about the local and regional hydrogeology of the Site and many assumptions were used to develop these estimates, which have been recorded thusly.

The first major assumption about Site hydraulics is that the groundwater is sourced by a steady-state, unconfined aquifer; therefore, the flow calculations for dewatering are dictated by the Thiem equation:

$$Q = \frac{\pi k[h_o^2 - h_w^2]}{\ln[R_o/R_w]} \quad \text{Eq. 1}$$

where: Q – Groundwater Flow Rate (cubic meters/day [m^3/d])
- k – Hydraulic conductivity at the Site (m/d)
- h_o – Saturated thickness before drawdown during dewatering (m)
- h_w – Saturated thickness during dewatering (m)
- R_w – Radius of working area (m)
- R_o – R_w + Radius of Influence [R_i] (m)

Hydraulic Conductivities:
Hydraulic conductivities used to estimate the flow rate were taken from the Draft EE/CA (E & E 2010) and will be used to provide a range of flow rates that are anticipated to be observed during dewatering activities at the Site:

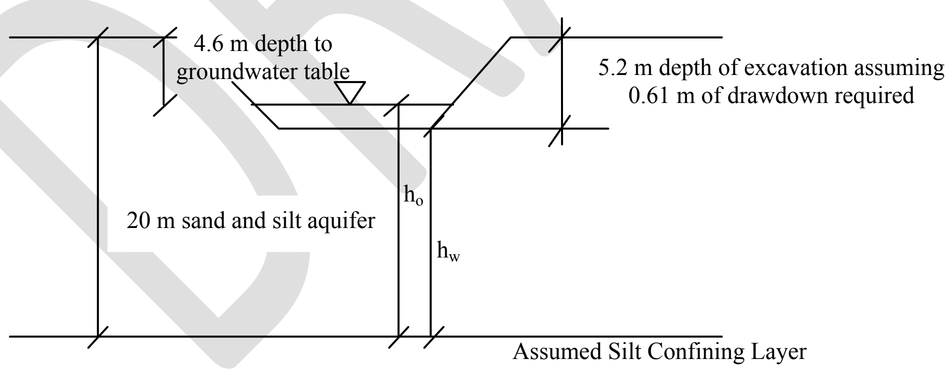
K_{min} = 0.195 m/d or 2.26E-6 (meters/second [m/s])

K_{avg} = 0.725 m/d or 8.39E-6 m/s
K_{max} = 1.570 m/d or 1.82 E-5 m/s

No seasonal conductivity monitoring was performed. These conductivities are based on limited data from a one-time sampling event between the existing wells on Site.

Saturated Thickness:
The saturated thickness (h_o) is defined as the depth from a "confining layer" to the top of the water table. Since no Site information has been obtained on the depth to bedrock or the total depth of the aquifer, this parameter had to be assumed. A literature search was performed to identify any available records of geology for the St. Joe River Valley, but none were available. The only relevant geotechnical reference identified for any location near the Avery Landing Site was a Feasibility Study performed along the St. Maries River at a creosote cleanup site (RETEC 2006). The St. Maries River Creosote Site aquifer consisted mainly of sand and silt with a confining silt layer occurring at approximately 65 feet (20 m) below ground surface. Although this location is not along the St. Joe River, nor near Avery Landing, the St. Maries River is part of the St. Joe River Valley watershed and therefore is deemed to be the best representative information available at this time. Figure 1 shows the saturated thickness values that were used in the calculations for the Avery Site with the assumptions that the groundwater table at the Site occurs at approximately 15 feet below ground surface (4.6 m) and that excavation will extend to 2 feet (0.61 m) below the groundwater table, or to a maximum depth of 17 feet (5.2 m).

Figure 1: Assumed Saturated Thickness



Given the schematic above, the assumed saturated thicknesses are as follows:

h_o = 20 m – 4.6 m = 15.4 m
h_w = 20 m – 5.2 m = 14.8 m

Working Radius and Total Radius:

To calculate the extent of the working area, an open excavation area limit of 0.25 acres (1012 m^2) was assumed, and the working area radius was calculated using the following equation:

$$R_w = \sqrt{(A/\pi)} = 17.9 \text{ m} \quad \text{Eq. 2}$$

To calculate R_o ($R_w + R_i$), the radius of influence was estimated using the assumption that the pumping during dewatering would act similar to that of groundwater withdrawals resulting from an extraction well. The radius of influence is governed by the equation:

$$R_i = Ch\sqrt{k} \quad \text{Eq. 3}$$

where:

C – Unitless constant for radial flow (3000)
h – Drawdown (assumed to be 0.61 m)
k – Hydraulic conductivity (m/s)

The maximum, minimum, and average hydraulic conductivity values presented above that were estimated for the Site were used to calculate the maximum, minimum, and average R_i and ultimately the R_o values that are anticipated to result from the dewatering that will occur during removal activities.

R_i (min) – 2.75 m
R_i (avg) – 5.30 m
R_i (max) – 7.80 m

thus:

R_o (min) – 20.67 m
R_o (avg) – 23.22 m
R_o (max) – 25.72 m

Resulting Flow Rate Range:

Using Equation 1 and the assumptions for the various parameters above, the resulting range of groundwater flow rates that are anticipated due to dewatering include:

Qmin – 77.75 m^3/d or 20,540 gal/day or 14.3 gal/min
Qavg – 159.29 m^3/d or 42,080 gal/day or 29.2 gal/min
Qmax – 247.33 m^3/d or 65,340 gal/day or 45.4 gal/min

A safety factor of 1.5 was used for the system design to ensure that the treatment facility had the capacity to handle additional wastewater streams if these estimates are in fact underestimated due to the many assumptions made.

The design flow rate will be **70 gallons per minute** (1.5*Qmax). Based on this flow rate, the system's influent and effluent tanks will be designed to hold at minimum one days worth of influent wastewater (98,010 gallons) or **100,000 gallons**.

References

RETEC. 2006. FS St. Maries Creosote Site. St. Maries Idaho. July 17, 2006

E & E (Ecology and Environment, Inc.). 2010. Draft EECA Avery Landing Site. December 2010.